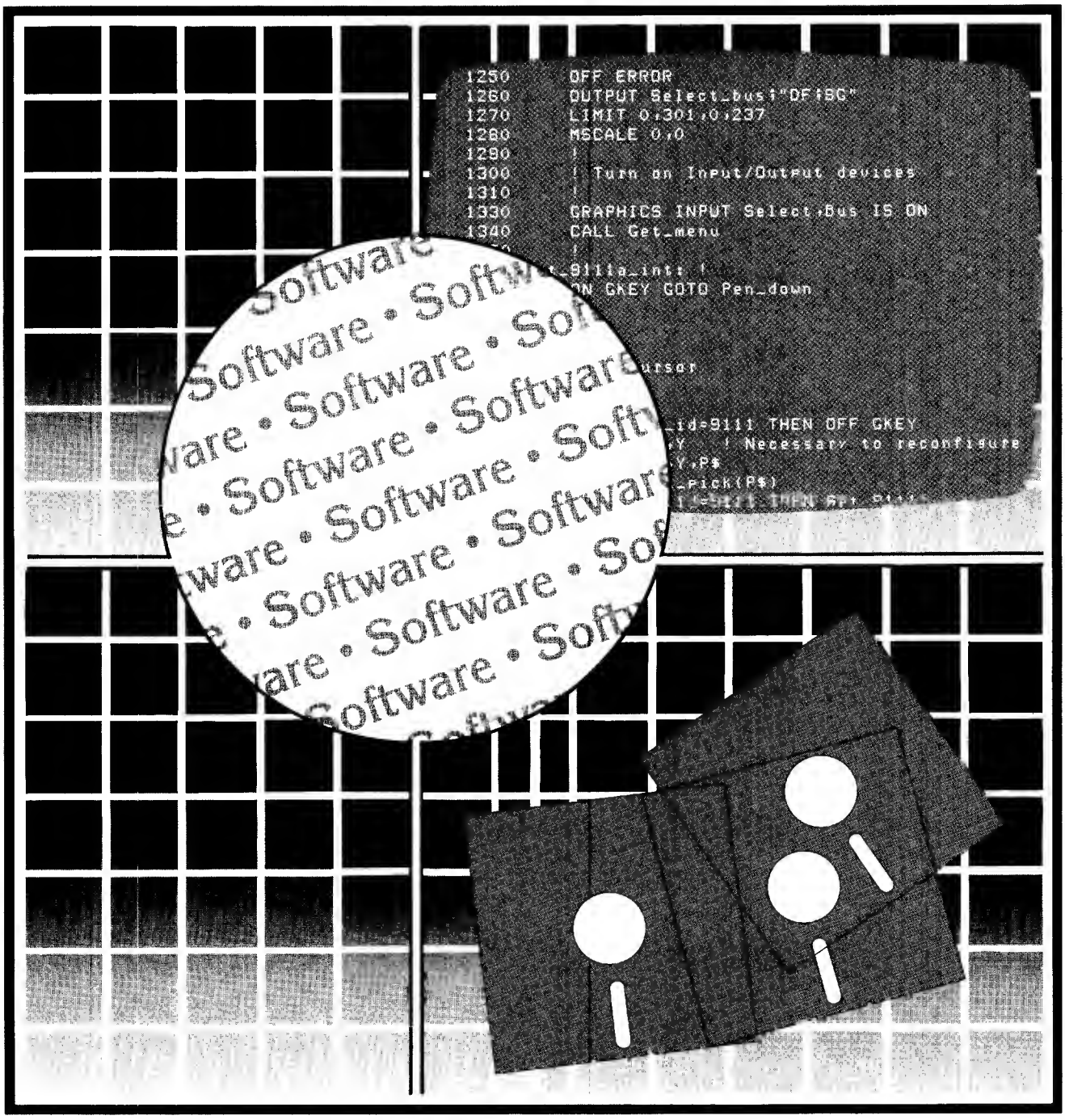
HP Series 200 Computers

HEWLETT PACKARD

BASIC Utilities Library



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BASIC Utilities Library

for the HP Series 200 Computers

Part No. 09800-10601

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Printing History

New editions of this manual will incorporate all material updated since the previous edition. Update packages may be issued between editions and contain replacement and additional pages to be merged into the manual by the user. Each updated page will be indicated by a revision date at the bottom of the page. A vertical bar in the margin indicates the changes on each page. Note that pages which are rearranged due to changes on a previous page are not considered revised.

The manual printing date and part number indicate its current edition. The printing date changes when a new edition is printed. (Minor corrections and updates which are incorporated at reprint do not cause the date to change.) The manual part number changes when extensive technical changes are incorporated.

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Important

The flexible disc containing the BASIC Utilities programs is very reliable, but being a mechanical device, is subject to wear over a period of time. To avoid having to purchase replacement program discs, we recommend that you immediately duplicate the contents of the discs onto a permanent backup disc. You should also keep backup copies of your important programs and data on separate media to minimize the risk of permanent loss.

Introduction

Description

This package of utility programs has been collected to aid you in your programming effort and to help you handle some special situations with your Hewlett-Packard Series 200 Computer System. The first five chapters of this manual describe those programs which will assist you in the management of files on your mass storage media. The sixth chapter describes three programs that assist you with the system configuration. The four programs described in Chapter 7 are programming aids, and the four programs discussed in Chapter 8 display status registers for data files and interface cards. Chapter 9 describes the Demonstration Package for the Series 200 Computer System.

System Configuration and Ordering Information

This manual is intended for use with the Series 200 BASIC Utilities Library which is shipped with the BASIC 2.0 operating system. The BASIC Utilities Library is represented by three sets of part numbers:

For 3½" disc media:

Complete package	09800-10300
Manual	09800-10601
Discs	09800-10304
	09800-10305
	09800-10306

For 5¼" disc media, external disc drive:

Complete package	09800-10500
Manual	09800-10601
Discs	09800-10504
	09800-10505
	09800-10506

For 5¼" disc media, internal disc drive:

Complete Package	09800-10600
Manual	09800-10601
Discs	09800-10604
	09800-10605
	09800-10606

The three sets of part numbers listed above replace the following part numbers:

Complete Package	09836-10000
Manual	09836-10601
Discs	09836-10004
	09836-10005
	09836-10006
	09836-10007

This manual also replaces manual part number 09836-10001 in the BASIC 1.0 Utilities Library (software pack part number: 09826-10000.)

Terminology

Because this BASIC Utilities Library is designed to run on all models of the Series 200 computer, this manual will frequently use the term **computer** to refer to any options of the computer.

Throughout the manual the terms sector and physical record are used interchangeably to describe a record of 256 bytes.

How to Use

To run any program in this Utility Library, first consult your BASIC Operating Manual, Chapter 1, especially the section describing Initial Power Up.

In order to run a particular program, consult the chapter of this manual pertaining to the program and follow the How to Use instructions found there. In most cases, this requires simply loading a program file and running it. The exception to this is in a few subprograms outlined in Chapters 2 and 7. Each of these needs a "driver" program that calls and utilizes them. The chapters which include the descriptions of these subprograms also describe the input parameters and the calling syntax required for each subprogram.

When using BASIC Extensions 2.0 (Part Number 98612A), if execution of a utility terminates because of an error condition and the typing aid softkeys do not reappear, type "LOAD KEY" (EXECUTE) to restore the typing aid softkeys.

Most utilities will use the mass storage unit specifier (msus) set on your computer prior to execution of the utility. Refer to your BASIC Operating Manual for information on how to set the msus. The utilities support the following mass storage devices in BASIC 2.0:

HP 82901, HP 82902
HP 9895
HP 9134, HP 9135, HP 9138
HP 9121

With BASIC Extensions 2.0, the HP CS80 series and the HP 9885 mass storage devices are also supported.

Following is a table of supported mass storage devices with the corresponding number of available sectors on the media:

Product	# of Sectors	
HP 8290X	1,056	(one 5¼" disc)
HP 9895	4,500	(one 8" double-sided disc)
HP 913X	4,500	(one volume of 4-volume Winchester disc)
HP 913X	18,848	(single volume Winchester disc)
HP 9121	1,056	(one 3½" single-sided disc)
CS80:		
HP 7908	64,750	
HP 7911	109,824	
HP 7912	256,256	

Chapter 1
Media Management Utilities

Introduction

This chapter describes a program which dumps records from the mass storage media in selected formats and a binary program that can be used with your own application programs.

PHYREC Binary Program (PHYREC)

Description

The PHYREC binary provides the facilities to do a bit-by-bit copy of data between an INTEGER array and mass storage media. There are two different PHYREC binaries, one for BASIC 1.0 and one for BASIC 2.0. The PHYREC binary for BASIC 2.0 is on disc 1 of your BASIC Utilities. However, if you encounter an Error 1 while LOADing PHYREC or a program with PHYREC appended to it then refer to the HELP program in Chapter 6 to correct the problem.

The keywords supported by the PHYREC binary are PHYREAD and PHYWRITE.

PHYREAD *numeric expression,name*(*)

The PHYREAD statement causes data to be copied from the media occupying the current MASS STORAGE IS device into the array given by *name*(*). The array must be of type INTEGER and may have one to six dimensions. The *numeric expression* is evaluated and rounded to an integer which specifies the sector (address) of the disc where the copy is to begin. It must be in the range 0 through 1055, inclusive. The system begins reading the disc at the start of the specified sector and copies the data read into the INTEGER array in row-major order. It copies data until it has written into every array element or until an attempt is made to read beyond the end of sector 1055. In the latter case, an end of file error is reported. Note that since no @*name* is involved (i.e., no assignment to a file name), this end of file error is not trappable by ON END, but only by ON ERROR.

PHYWRITE *numeric expression,name*(*)

The PHYWRITE statement causes data to be copied from the array given by *name*(*) to the medium occupying the current MASS STORAGE IS device. The array must be of type INTEGER and may have one to six dimensions. The *numeric expression* is rounded and evaluated to an integer which must be in the range 0 through 1055, inclusive. The system does a row-major order copy of the INTEGER array to the disc starting at the beginning of the specified sector (address). An end of file error is reported if an attempt is made to write beyond the end of sector 1055. Note that since no @*name* is involved, this end of file error is not trappable by ON END, but only by ON ERROR.

Note

The arrays used by PHYREC are subject to the usual OPTION BASE rules. Caution must be used so that the data will be copied to and from the expected array elements.

How to Use

File name: PHYREC, disc 1

Type: LOAD BIN "PHYREC"
Press: EXECUTE

This binary program must be LOADed into memory before any program using the PHYREAD/PHYWRITE keywords is executed or an error will result. If you LOAD the PHYREC binary (or a program with a PHYREC binary appended to it), then try to LOAD BIN a non-scratchable binary, (e.g., the SRM Binary), you will encounter an Error 1. You must LOAD BIN a non-scratchable binary prior to LOADing any program that contains a scratchable binary (such as PHYREC). (Note that the HELP program will not recover from this error.)

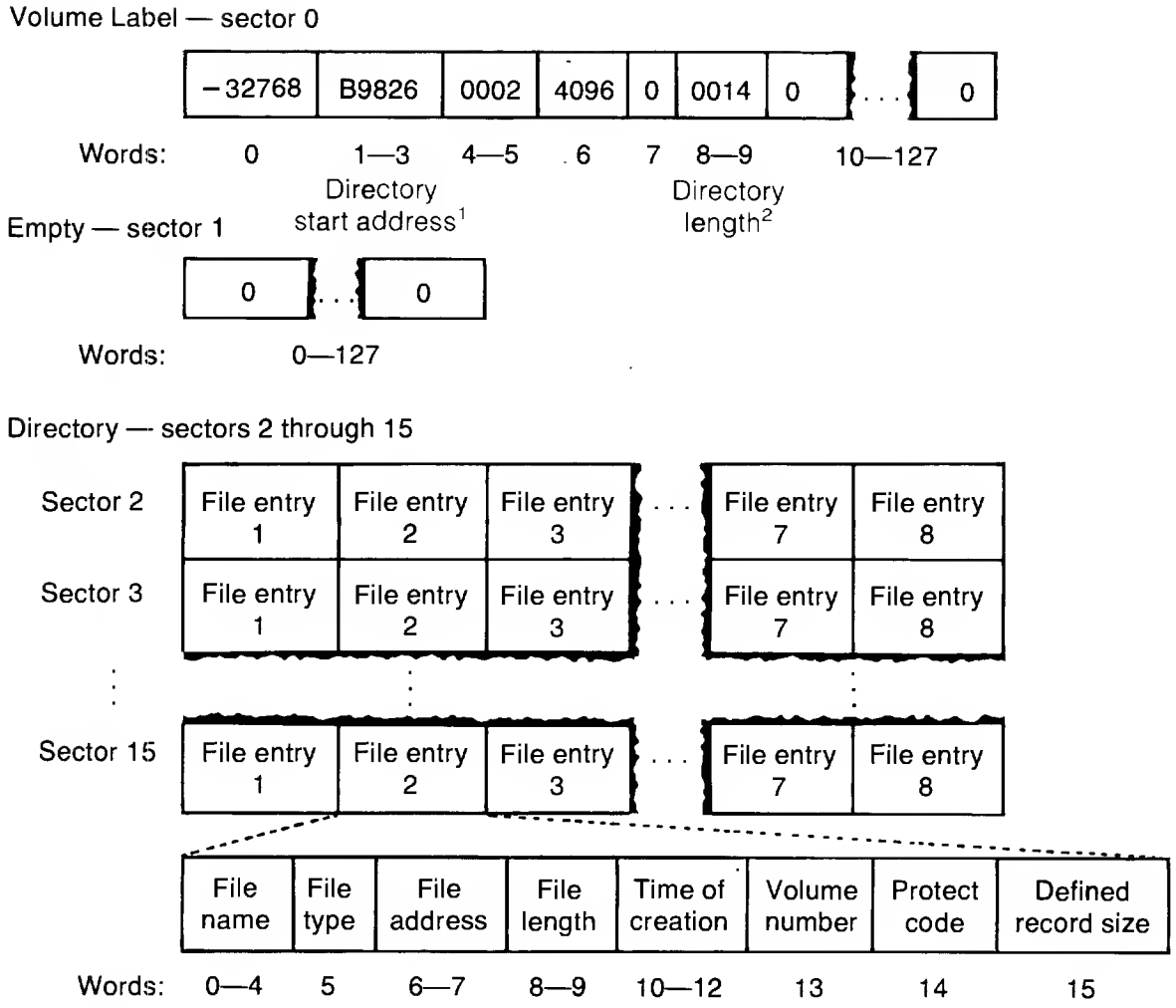
With the PHYREC binary program loaded into memory you can also develop your own programs using the PHYREAD/PHYWRITE keywords. It is strongly recommended that you have a very complete understanding of the format of your mass storage media before using the PHYREC binary in your own programs. PHYREAD is relatively harmless, but PHYWRITE could cause you to lose valuable information on your disc if not used correctly.

Special Considerations and Programming Hints

1. The integer array that is used by PHYREAD or PHYWRITE should be dimensioned to some convenient size where the number of disc accesses is minimized. For example, to read in the contents of an entire file composed of 10 physical records, the dimensions for the integer array might be 10 by 128 (assuming OPTION BASE 1) where 10 is the number of records and 128 is the size in words of a physical record.
2. This or any binary program can be STOREd along with a program in a PROG file and LOADed into memory with the program. However, if the binary is STOREd with a subprogram, LOADSUB ALL FROM *file* does not reload the binary into memory, but rather only the subprogram itself. Error messages will occur if keywords from the binary are used in the subprogram and the binary has not yet been loaded.
3. In order to effectively use the PHYREC binary, an understanding of the disc structure is needed.

   The 5¼" disc is composed of 66 tracks with 16 addressable sectors per track. Since track numbers are not typically used, sectors are addressed 0 through 1055 for the entire range of sectors on one disc. The physical layout of the disc is not important at this time. The contents of each sector are, however. Keep in mind that a sector is the only addressable unit to be used when referring to the disc using PHYREC. See Table 1 on the following page for contents of each sector.
4. It should be noted that the contents of the directory as it resides on the disc may be slightly different than the information that appears after executing the CAT command. This is because the CAT routine interprets some of the directory information and prints it out in a more informative manner. See Table 2 for the differences between directory and CAT values.
5. If you are using a disc other than the 5¼" disc which has been initialized by BASIC, then the volume label will probably contain a different directory length and the file space will probably differ from what is specified in Table 1.

Table 1: Disc Contents



File name: five words; up to 10 characters

File type: one word

- 1 — ASCII
- 0 — empty
- −1 — logical end of directory
- −5775 — BIN
- −5791 — BDAT
- −5808 — PROG
- −5822 — SYSTM

File address: two words; sector at which file contents begin

File length: two words; number of sectors spanned by file's contents

Time of creation: three words; set to 0 during file creation time; not currently used by system

Volume number: one word; set to $-2^{15} + 1$ during creation of a new file; not currently used by system

1 Directory start address: disc sector in which directory begins. This value may vary, however, 2 is the standard default value for the 5¼" disc.

2 Directory length: number of sectors used by the directory. This value may vary, however, 14 is the standard default value for the 5¼" disc.

3 Volume label: B9826 or B9836 is the standard default volume label for a 5¼" disc; however, other labels are possible.

Protect code: one word; up to 2 characters worth of information; must be 0 for ASCII files; default setting is blank for all other file types

Defined record size: BDAT - size in words of defined records; if this is zero, it implies the defined record size is one byte.

ASCII - This field is ignored by your computer, but it should always be zero for compatibility with other systems.

PROG,BIN - This field is ignored by your computer, but it should be 128 for compatibility with future products.

File Space — sectors 16 through 1055; herein lies the actual contents of all files[1].

Table 2: Differences Between Directory and CAT Values

Field	File Type	Directory Value	CAT Value
file type	empty entry	1	ASCII
	logical end of directory	0 -1	
	BDAT		
	BIN	-5791	BDAT
	PROG	-5775	BIN
	SYSTEM	-5808	PROG
		-5822	SYSTM
file address	BDAT	n	n+1
	All other types	n	n
file length	BDAT	number of physical records	number of defined records specified by the user at file creation time; read from words 4 and 5 of the system sector which is stored as the first sector of the file
	All other types	n	n
protect code	ASCII	0	
	All other types	2-character code	* (if protected)
defined record size	ASCII	0	256
	BIN	128	256
	PROG	128	1
	BDAT	if n=0	2n
		if n>0 (length in words)	(length in bytes)

Error Messages

As mentioned in the description of the PHYREC binary program, if an attempt is made to read or write past sector 1055[1], an end of file error is reported. Since no *@name* is associated with PHYREAD or PHYWRITE, this error is not trappable by ON END, but rather only by the implementation of an ON ERROR statement with a check of the nature of the error found.

1 Assuming a 5¼" disc with the default values of 14 sectors for the directory length and sector 2 for the directory start

Formatted Record Dump (DUMP)

Description

This program dumps a specified record from your disc in integer, hex, octal/ascii, hex/ascii, LIF directory, and LIF system formats (for information on Logical Interchange Format (LIF) standards, see the Special Considerations of the section on PHYREC in Chapter 1).

How to Use

File name: DUMP, disc 1
Also uses: PHYREC, disc 1

Type: LOAD "DUMP"
Press: EXECUTE

When the asterisk ("*") in the lower right corner of the screen disappears, indicating that the program is loaded,

Press: RUN

The program prompts for several actions and displays a softkey menu.

Required Input and Expected Results

1. Install the proper disc and press CONTINUE. (The mass storage unit specifier will default to the mass storage unit set on your machine before the start of this program or you may execute a MASS STORAGE IS command before pressing CONTINUE.)
2. The program then displays a softkey menu with the following labels:

   RECORD# , hex , hex/ascii , LIF sys , CAT ,
   N+1,N−1 , integer , oct/ascii , LIF dir , EXIT.

   A printed line just above the menu displays the chosen dump format. At program entry, the dump format defaults to hex. The results of pressing a softkey are listed below.

a. RECORD # ([k0]):

The softkey menu disappears and the program prompts you to input the number of the record you want to dump. Type in the number of the record and press [ENTER]. The program then dumps the specified record in the format that was displayed in the printed line above the softkey menu. When the dump is completed the program returns to the softkey menu. If you press [CONTINUE] or [ENTER] with no entry when the program prompts you for a record number, then the program dumps the previously dumped record (record 0 if no record has been dumped) in the format most recently displayed above the softkey menu, and returns to the menu after the dump is complete.

b. hex ([k1]):

The printed line above the menu changes to "hex format." If a record is dumped while this format is displayed then the record will be formatted as shown below.

```
Hex dump of record  2

     0 1  2 3  4 5  6 7  8 9  A B  C D  E F
0X   5245 5649 4420 2020 2020 0001 0000 0010
1X   0000 0001 0000 0000 0000 8001 0000 0000
2X   5048 5952 4543 2020 2020 E971 0000 0011
3X   0000 0007 0000 0000 0000 8001 2020 0080
4X   4455 4D50 2020 2020 2020 E950 0000 0018
5X   0000 0069 0000 0000 0000 8001 2020 0080
6X   4449 5245 4354 4F52 5920 E950 0000 0081
7X   0000 007A 0000 0000 0000 8001 2020 0080
8X   4341 5420 2020 2020 2020 E950 0000 00FB
9X   0000 001C 0000 0000 0000 8001 2020 0080
AX   494E 464F 2020 2020 2020 E950 0000 0117
BX   0000 0019 0000 0000 0000 8001 2020 0080
CX   4352 4541 5445 2020 2020 E950 0000 0130
DX   0000 001C 0000 0000 0000 8001 2020 0080
EX   5A41 5020 2020 2020 2020 E950 0000 014C
FX   0000 0013 0000 0000 0000 8001 2020 0080
```

c. hex/asc ([k2]):

The printed line above the menu changes to "hex/ascii format." If a record is dumped while this format is displayed, the record will be formatted as shown below.

```
Hex/ascii dump of record  2

     +0 +1 +2 +3 +4 +5 +6 +7  01234567
00   52 45 56 49 44 20 20 20  REVID
04   20 20 00 01 00 00 00 10     ......
08   00 00 00 01 00 00 00 00  ........
0C   00 00 80 01 00 00 00 00  ........
10   50 48 59 52 45 43 20 20  PHYREC
14   20 20 E9 71 00 00 00 11    iq....
18   00 00 00 07 00 00 00 00  ........
1C   00 00 80 01 20 20 00 80  ....  ..
20   44 55 4D 50 20 20 20 20  DUMP
24   20 20 E9 50 00 00 00 18    iP....
28   00 00 00 69 00 00 00 00  ...i....
2C   00 00 80 01 20 20 00 80  ....  ..
30   44 49 52 45 43 54 4F 52  DIRECTOR
34   59 20 E9 50 00 00 00 81  Y iP....
38   00 00 00 7A 00 00 00 00  ...z....
3C   00 00 80 01 20 20 00 80  ....  ..
40   43 41 54 20 20 20 20 20  CAT
44   20 20 E9 50 00 00 00 FB    iP...{
48   00 00 00 1C 00 00 00 00  ........
4C   00 00 80 01 20 20 00 80  ....  ..
50   49 4E 46 4F 20 20 20 20  INFO
54   20 20 E9 50 00 00 01 17    iP....
58   00 00 00 19 00 00 00 00  ........
5C   00 00 80 01 20 20 00 80  ....  ..
60   43 52 45 41 54 45 20 20  CREATE
64   20 20 E9 50 00 00 01 30    iP...0
68   00 00 00 1C 00 00 00 00  ........
6C   00 00 80 01 20 20 00 80  ....  ..
70   5A 41 50 20 20 20 20 20  ZAP
74   20 20 E9 50 00 00 01 4C    iP...L
78   00 00 00 13 00 00 00 00  ........
7C   00 00 80 01 20 20 00 80  ....  ..
```

Control characters are masked out and replaced by periods because they can cause unusual results when sent to a printer.

d. LIF sys (k3):

The printed line above the menu changes to "LIF system format." If a record is dumped while this dump format is displayed, then the record will be formatted as shown below.

```
Formatted LIF system record dump (record  0 )

word(s) hex dump      description      contents
     0: 8000          IDENTIFICATION   100000 oct
   1-3: 444953433120  VOLUME LABEL     "DISC1 "
   4-5: 00000002      DIRECTORY S.A.   2  dec
     6: 1000          OCTAL 10000      010000 oct
     7: 0000          DUMMY WORD       0  dec
   8-9: 0000000E      DIRECTORY LEN.   14  dec
    10: 0000          VERSION NUMBER   0  dec
    11: 0000          ZERO WORD        0  dec
                    (level 1 extents)
 12-13: 00000000        TRACKS/SURFACE  0  dec
 14-15: 00000000        SURFACES/MEDIA  0  dec
 16-17: 00000000        SECTORS/TRACK   0  dec
 18-20: 0000            VOLUME STAMP    0000
                    (reserved for future use)
21-126: 0000 0000 0000 0000 0000 0000 0000 0000
        0000 0000 0000 0000 0000 0000 0000 0000
        0000 0000 0000 0000 0000 0000 0000 0000
        0000 0000 0000 0000 0000 0000 0000 0000
        0000 0000 0000 0000 0000 0000 0000 0000
        0000 0000 0000 0000 0000 0000 0000 0000
        0000 0000 0000 0000 0000 0000 0000 0000
        0000 0000 0000 0000 0000 0000 0000 0000
        0000 0000 0000 0000 0000 0000 0000 0000
        0000 0000 0000 0000 0000 0000 0000 0000
        0000 0000 0000 0000 0000 0000 0000 0000
        0000 0000 0000 0000 0000 0000 0000 0000
        0000 0000 0000 0000 0000 0000 0000 0000
        0000 0000 0000 0000 0000 0000 0000 0000
        0000 0000
                    (user dependent fields)
   127: 0000            250 MEDIA MAINT 0  dec
```

This format is only meaningful when the record dumped is the Logical Interchange Format system record (record 0 on any LIF media). For further information on LIF standards, see the Special Considerations in the section on PHYREC in Chapter 1.

e. CAT (k4):

The program displays a catalog of the current mass storage media.

f. N+1, N−1 (k5):

A new softkey menu is displayed to determine which option, N+1 k5 or N−1 k6 the user wants to execute. Pressing k9 will cause program execution to end. If k5 is pressed, the program increments the record number and dumps the next physical record in the format specified by the line printed just above the menu. If k6 is pressed, the program decrements the record number and dumps the previous physical record in the format specified by the line printed just above the menu.

g. integer (k6):

The printed line just above the menu changes to "integer format." If a record is dumped while this format is displayed, the record will be formatted as shown below.

```
Integer dump of record  2

 21061      22089      17440      8224       8224        1          0         16
 0          1          0          0          0          -32767      0         0
 20552      22866      17731      8224       8224       -5775       0         17
 0          7          0          0          0          -32767      8224      128
 17493      19792      8224       8224       8224       -5808       0         24
 0          105        0          0          0          -32767      8224      128
 17481      21061      17236      20306      22816      -5808       0         129
 0          122        0          0          0          -32767      8224      128
 17217      21536      8224       8224       8224       -5808       0         251
 0          28         0          0          0          -32767      8224      128
 18766      17999      8224       8224       8224       -5808       0         279
 0          25         0          0          0          -32767      8224      128
 17234      17729      21573      8224       8224       -5808       0         304
 0          28         0          0          0          -32767      8224      128
 23105      20512      8224       8224       8224       -5808       0         332
 0          19         0          0          0          -32767      8224      128
```

h. oct/asc (k7):

The printed line just above the menu changes to "octal/ascii format." If a record is dumped while this format is displayed, then the record will be formatted as shown below.

```
Octal/ascii dump of record  2

        0/1     2/3     4/5     6/7   01234567
00   051105  053111  042040  020040   REVID
04   020040  000001  000000  000020      .....
10   000000  000001  000000  000000   ........
14   000000  100001  000000  000000   ........
20   050110  054522  042503  020040   PHYREC
24   020040  164561  000000  000021     iq....
30   000000  000007  000000  000000   ........
34   000000  100001  020040  000200   ....  ..
40   042125  046520  020040  020040   DUMP
44   020040  164520  000000  000030     iP....
50   000000  000151  000000  000000   ...i....
54   000000  100001  020040  000200   ....  ..
60   042111  051105  041524  047522   DIRECTOR
64   054440  164520  000000  000201   Y iP....
70   000000  000172  000000  000000   ...z....
74   000000  100001  020040  000200   ....  ..
00   041501  052040  020040  020040   CAT
04   020040  164520  000000  000373     iP...{
10   000000  000034  000000  000000   ........
14   000000  100001  020040  000200   ....  ..
20   044516  043117  020040  020040   INFO
24   020040  164520  000000  000427     iP....
30   000000  000031  000000  000000   ........
34   000000  100001  020040  000200   ....  ..
40   041522  042501  052105  020040   CREATE
44   020040  164520  000000  000460     iP...0
50   000000  000034  000000  000000   ........
54   000000  100001  020040  000200   ....  ..
60   055101  050040  020040  020040   ZAP
64   020040  164520  000000  000514     iP...L
70   000000  000023  000000  000000   ........
74   000000  100001  020040  000200   ....  ..
```

Control characters are masked out because they can cause unusual results when sent to a printer.

i. LIF dir (k8):

The printed line just above the menu changes to "LIF directory format." If a record is dumped while this dump format is displayed, the record will be formatted as shown below.

```
Formatted LIF directory record dump (record  2 )

 field        hex dump               contents
(entry  0 )
 FILE NAME    5245564944202020202020 "REVID      "
 FILE TYPE    0001                    1  dec
 START ADDR   00000010                16  dec
 FILE LENGTH  00000001                1  dec
 CREATE TIME  0000 0000 0000
 L FLAG/VOL#  8001                    set/ 1  dec
 IMPL DEPEND  00000000
(entry  1 )
 FILE NAME    5048595245432020202020 "PHYREC     "
 FILE TYPE    E971                   -5775  dec
 START ADDR   00000011                17  dec
 FILE LENGTH  00000007                7  dec
 CREATE TIME  0000 0000 0000
 L FLAG/VOL#  8001                    set/ 1  dec
 IMPL DEPEND  20200080
                    •
                    •
                    •
(entry  7 )
 FILE NAME    5A4150202020202020 "ZAP        "
 FILE TYPE    E950                   -5808  dec
 START ADDR   0000014C                332  dec
 FILE LENGTH  00000013                19  dec
 CREATE TIME  0000 0000 0000
 L FLAG/VOL#  8001                    set/ 1  dec
 IMPL DEPEND  20200080
```

This format is only meaningful when the record dumped contains part of the Logical Interchange Format directory. For more information on LIF standards, see the Special Considerations of the section on PHYREC in Chapter 1.

j. EXIT (k9):

Program execution is ended.

Special Considerations and Programming Hints

1. The knob can be used to scroll backward, but may not reach the beginning of the text. However, (PAUSE) may be used to stop the program at a relevant place.
2. The PRINTER IS command may be used to direct the output to a printer.
3. This utility is not intended for use with SRM (MSI ":REMOTE").

Error Messages

This program tries to trap most common errors. The program informs you of the type of error trapped and returns to where the error was made so you may try again. If an unexpected error is trapped, the program reports the error number and aborts. Should you encounter an untrapped error, check that the correct key combination was pressed (for example, often times (EXECUTE) is pressed rather than (ENTER) or (CONTINUE)). If you cannot discern the cause of the error or an acceptable correction, consult your HP sales representative.

Chapter 2
Directory Management Utilities

Introduction

The programs and subprograms in this section will aid in the management of directory entries on your LIF[1] disc. These programs will allow you to do the following:

- List an extended directory catalog which includes purged files still in directory (DIRECTORY)
- Recover from some accidental purges (DIRECTORY)
- Programmatically obtain useful information from a LIF directory of a mass storage media (CAT and INFO)
- Create a new entry of any standard file type in a LIF directory (CREATE)
- Give a used LIF disc the appearance of just having been reinitialized

1 LIF refers to Hewlett-Packard's Logical Interchange Format for mass storage media. See the discussion on PHYREC in Chapter 1 for more information.

Extended Directory Catalog (DIRECTORY)

Description

This program lists the following information about the current mass storage media:

- An extended catalog including the directory entries of recently purged files
- The number of physical records available
- The size of the largest free space

The program allows you to purge an existing file, rename an existing file, or unpurge a purged file as long as that file still has a directory entry and is not overlapping an existing file.

How to Use

Filename: DIRECTORY, disc 1
Also uses: PHYREC, disc 1

Type: LOAD "DIRECTORY"
Press: EXECUTE

When the asterisk ("*") in the lower right corner of the screen disappears, indicating that the program is loaded,

Press: RUN

The program prompts for several actions and displays an extended catalog.

Required Input and Expected Results

1. Install the proper disc and press CONTINUE. (The mass storage unit specifier defaults to the mass storage unit set on your machine before the start of this program, or you may execute a MASS STORAGE IS command before pressing CONTINUE. Note that the number of physical records available and the size of the largest free space, as given by this program, are valid only for the devices listed under How to Use in the Introduction of this manual.
2. The program lists out the extended directory catalog of the media you have installed, and displays the following softkey labels:

   PURGE, UNPURGE, NEW CAT, RENAME, and EXIT

   The results of pressing a labeled softkey are listed below.

   a. PURGE (k5):

      The program prompts you for the name of the file you wish to purge. Type in the name of the file to be purged and press ENTER. The program then purges the specified file and lists the new extended catalog.

b. UNPURGE ([k6]):

The program prompts you for the name of the file you wish to unpurge. Type in the name of the file to be restored and press [ENTER]. If there is more than one purged file with the name you entered, the program prompts you to choose the file you wish to unpurge and lists the entries with numeric labels. Type in the number of the file you wish to unpurge and press [ENTER]. If there is an existing file with the same name as the file you wish to unpurge, then the program will prompt you for a new name for the file to be restored. Type a new name for the file and press [ENTER]. (Be sure not to use the name of a file that is already existing for your new name.) Next the program prompts you to specify the file type of the file to be unpurged. The following softkey labels are displayed:

ASCII, BDAT, BINARY, PROG, SYSTM, OTHER and RETURN.

It is crucial that you select the correct file type. Choosing the incorrect file type will produce unexpected and possibly uncorrectable results. (See the Special Considerations section for this chapter.) So, DO NOT GUESS THE FILE TYPE!!! (If you are uncertain of the file type press the RETURN softkey and the program will return to the original softkey menu.) Press the softkey corresponding to the correct file type. The program then unpurges the specified file (renamed if necessary) and lists the new extended catalog.

c. NEW CAT ([k7]):

The program lists the extended catalog.

d. RENAME ([k8]):

The program prompts for the name of the file you wish to rename. Type in the name of the file and press [ENTER]. Next the program prompts you for the new name of the file. Type in the new name and press [ENTER]. The program then RENAMEs the specified file and lists the new extended catalog.

e. EXIT ([k9]):

Program execution is terminated.

3. At any input prompt, pressing [CONTINUE] with no entry will cause the program to exit the subprogram and return to the main menu.

Special Considerations and Programming Hints

1. Although this program works with any disc conforming to Hewlett-Packard's Logical Interchange Format standard, minimum configuration machines using eight inch flexible discs may not have enough internal memory to run this program if the disc directory size exceeds the default size (28 records, 224 possible files, for single-sided eight inch flexible discs; 58 records, 464 possible files, for double-sided flexible eight inch discs). However, if you are using the internal flexible mini-disc you will have enough memory to run this program with any possible directory size.
2. If you use this program to RENAME a protected file, you must include the protect code as part of the file name. The protect code will remain with the RENAMEd file unless you specify a new one.

3. The number of records in a file listed in the extended catalog is the number of physical records (256 bytes) used by a file. For BDAT files, this differs from the listing in the catalog obtained by executing the CAT command in which the number of records per file is given in terms of defined records. (Defined records are possible with BDAT files only.) This program's extended catalog also includes a special information record (the System Sector) in the number of records per file for BDAT files. The CAT command's catalog does not include this record, so the listings for BDAT files in this program will show the starting addresses to be one physical record less, and the file to have one more physical record than the listings given by the CAT command. (For further information, see the Special Considerations and Programming Hints for PHYREC in Chapter 1.)
4. Unexpected and possibly uncorrectable results will occur if a file is unpurged and assigned an incorrect file type. If a file which was not previously a BDAT file is unpurged and assigned to type BDAT, the length field given by the CAT command will be incorrect. This error will not show up in this program's extended catalog. ASCII files cannot have a protect code, and consequently, the protect code field in the directory entry for an ASCII file contains two zeros. If you unpurge an ASCII file and specify the file type as PROG, BDAT or BIN, the operating system will read the zeros in the protect code field as a protect code of "$^{N}{}_{U}{}^{N}{}_{U}$". To unpurge this kind of file you must do the following:

   Press: (PAUSE)
   Type: PURGE "*program name*<$^{N}{}_{U}{}^{N}{}_{U}$>
   Press: (ANY CHAR) ((SHIFT) (STEP))
   Type: 000
   Press: (ANY CHAR) ((SHIFT) (STEP))
   Type: 000>"
   Press: (EXECUTE)

   (Line should appear as PURGE "*program name*<$^{N}{}_{U}$ $^{N}{}_{U}$>")
   You may then unpurge the file again.

   SYSTM files also do not have protect codes. In this case the protect code field in the directory entry contains other data. Therefore, if a SYSTM file is unpurged and assigned either BDAT, BIN or PROG type, it will appear as a protected file, and you will be unable to purge it. (Note that if the extended catalog indicates that a file is only one physical record long, then the file cannot be a BDAT file since all BDAT files require at least one physical record for the System Sector and at least one more physical record to contain the specified number of defined records.) You may remove the file from your disc by guessing the protect code, by reinitializing the disc, or by using the ZAP subprogram (also in Chapter 2).
5. The file types provided on the softkey menu of the UNPURGE section of this program are strictly Series 200 BASIC file types. In order to specify a non-BASIC or a non-Series 200 file type, you must press the softkey labeled OTHER ((k3)). The program then asks for the integer representation of your file type (e.g., for an HPL PROGRM file, the integer representation is −6128). If you specify a Series 200 BASIC file type for a file created by another language or system, you may encounter results similar to those discussed in the previous paragraph.
6. Purged programs do not show protect codes. Therefore, you may unpurge a file that was protected, but you must remember the protect code in order to access the file once it has been unpurged.

7. The number of physical records available and the size of the largest free space, as listed after the extended catalog in this program, are not valid for any media other than those listed at the introduction of this manual. If your mass storage device is a CS80 disc drive, the program prompts you to input the total number of sectors. Use the table in the How to Use section of the Introduction of this manual for the appropriate number of sectors.
8. In some special situations, a disc's directory may be filled with zeros rather than have an end of directory marker. In order to handle this situation, the program considers a null file name to be an end of directory marker. Therefore, if you have a null file name on your disc, then any programs after that entry will not be listed in the extended catalog. (Note: Normal operations performed on the directory by the Series 200 BASIC operating system will not create a null file name.)
9. If a file has been purged and another file now covers it (partially or completely), the covered file may still be unpurged provided the covering file is also purged. However, the covered file may not be intact, and there may be unexpected results.

Error Messages

This program tries to trap most common errors. The program informs you of the type of error trapped and returns to where the error was made so you may try again. If an unexpected error is trapped, the program reports the error number and aborts. Should you encounter an untrapped error, check that the correct key combination was pressed (for example, often times EXECUTE is pressed rather than ENTER or CONTINUE). If you cannot discern the cause of the error or an acceptable correction, consult your HP sales representative.

Catalog Subprogram (CAT)

Description

This utility reads the directory from the disc currently installed in the 9826/9836 into the array A$(*). From here the information contained in a disc's directory can be used programmatically. Information such as determining whether a file exists, the number of records in a file, and a file's starting address can be controlled within a program.

How to Use

Subprogram file: CAT, disc 1
Also uses: PHYREC, disc 1

Calling syntax: CALL Cat(A$(*),Dstart,Dleng,Num_files)

Input parameters:

Dstart — Integer variable from calling program that designates the sector in which the directory starts. This is given in words 4 and 5 of sector 0. (See the section on PHYREC in Chapter 1.)

Dleng — Integer variable from calling program that designates the length of the directory (in sectors). This is given in words 8 and 9 of sector 0. (See the section on PHYREC in Chapter 1.)

Output parameters:

Num_files — Integer variable which returns the number of files currently in the directory.

A$(*) — Array is set up and dimensioned by the calling program using the formula A$(Dleng*64 – 1)[18] if OPTION BASE 0 is in effect. (Note: If OPTION BASE is not the same in subprogram cat as in the calling program, make sure you are aware of the locations of valid catalog information in A$(*).) A$(*) returns values equivalent to the execution of a CAT command. Every eighth element (starting with 0th element) contains the following information in the order given:

- file name
- file type
- starting address
- file length in physical records (in defined records for BDAT files)
- time of creation (not currently used)
- volume information (not currently used)
- protect code designation
- defined record size

For example, A$(0) contains the file name of the first file entry, A$(1) contains that file's type, A$(2) contains its starting address, and so on. A$(8) contains the file name of the second file entry, A$(9) the file type, and so on again.

Required Input and Expected Results

No user interaction is necessary unless an error occurs. The contents of your disc's directory should be placed in the A$(*) array and passed into the driving program.

Special Considerations and Programming Hints

1. Unexpected or incomplete results could occur if the subprogram is stopped before execution completes.

Error Messages

This subprogram tries to trap the more common error situations, allow you to correct them and continue gracefully without detriment to the running program. If, however, an error occurs which the program was not prepared to handle, do not press any key on the keyboard until you have determined the exact nature of the error.

Directory Information Subprogram (INFO)

Description

When given a file name, this subprogram searches the disc directory to find a matching file name and returns the first and last physical record addresses, the number of defined records, the defined record length, and the file type. If the file is not found, this is also indicated.

How to Use

Subprogram file: INFO, disc 1
Also uses: CAT (optionally), disc 1

Calling syntax: CALL Info(File$,Dstart,Dleng,Strt,Stp,Lrecs,L_rec_l,Ftype)
or CALL Info(File$,Strt,Stp,Lrecs,L_rec_l,Ftype,A$(*)Numfiles

Input parameters:

File$	Name of the file for which information is desired.
Numfiles (opt.)	Integer variable that contains the number of files currently in the directory. Result of subprogram CAT and associated with array A$(*)
Dstart	Integer variable from calling program that designates the sector in which the directory starts. This is given in words 4 and 5 of sector 0.
Dleng	Integer variable from calling program that designates the length of the directory (in sectors). This is given in words 8 and 9 of sector 0.
A$(*) (opt.)	Array from subprogram Cat containing the disc's directory contents. If Cat has not yet been called, subprogram Info will call it in order to have access to the contents of the disc's directory.

Output parameters:

Strt	Integer variable that contains the address of the first physical record of File$.
Stp	Integer variable that contains the address of the last physical record of File$.
Lrecs	Integer variable that contains the number of defined records in File$.
L_rec_l	Integer variable that contains the length in words of each defined record of File$.
Ftype	Integer variable that contains the file type of File$: 1 — ASCII -5775 — BIN -5791 — BDAT -5808 — PROG

Required Input and Expected Results

No user interaction is necessary. The output parameters of the subroutine should be passed into driving program.

Special Considerations and Programming Hints

1. Unexpected or incomplete results could occur if the subprogram is stopped before execution completes.

Error Messages

No errors are trapped programmatically by this subprogram.

Create File Subprogram (CREATE)

Description

Given a file name, number of defined records, defined record size, and file type, this subprogram creates a file entry in the disc directory pointing to a location where the file's contents may be inserted before, after, or in between other files. This subprogram allows you to go beyond the CREATE ASCII and CREATE BDAT commands and create file entries for PROG and BIN file types. If the file's contents will fit on the disc, the new file's address is returned to the calling program. Otherwise, a flag is raised to indicate any problems.

How to Use

Subprogram file: CREATE, disc 1
Also uses: PHYREC, disc 1

Calling syntax:

CALL Create(File$,Num_recs,L_rec_length,Ftype,Dstart,Dleng,New_address,Err)

Input parameters:

File$	Name of file to be created.
Num_recs	Integer variable containing the number of defined records in File$.
L_rec_length	Integer variable indicating the length of the defined records. The integer represents the number of words per record for ASCII, PROG, and BIN files and the number of bytes per record for BDAT files.
Ftype	Integer variable indicating the new file's type. 1 — ASCII 0 — empty −1 — logical end of directory −5775 — BIN −5791 — BDAT −5808 — PROG
Dstart	Integer variable from calling program that designates the sector in which the directory starts. This is given in words 4 and 5 of sector 0. (See the section on PHYREC in Chapter 1.)
Dleng	Integer variable from calling program that designates the length of the directory (in sectors). This is given in words 8 and 9 of sector 0. (See the section on PHYREC in Chapter 1.)

Output parameters:

New_address	Integer variable which returns the file's new address.
Err	Integer variable that returns the status results of the Create routine: 0 — valid entry made 1 — no room in directory for entry 2 — no file space available 3 — duplicate file name

Required Input and Expected Results

No user interaction is necessary. A new directory entry should be created and the new address should be passed into the driving program.

Special Considerations and Programming Hints

1. Note that subprogram CREATE creates only a new file entry in the directory. It alone does not affect the file space on the disc.
2. Files of the type ASCII, BIN and PROG can only have a defined record length of 256.
3. You will get unexpected results in file length if you use CREATE to create a BDAT file entry. The reason is that file length is read from the first sector (system sector) of the file itself rather than from the directory entry.
4. Unexpected or incomplete results could occur if the subprogram is stopped before execution completes.

Error Messages

No errors are trapped programmatically by this subprogram.

Zap Mass Storage Media Subprogram (ZAP)

Description

This subprogram causes the currently installed "used" disc to appear to have just been re-initialized. It does this by placing a −1 in the file type field of the first directory entry to denote the logical end of the directory.

How to Use

Subprogram file: ZAP, disc 1
Also uses: PHYREC, disc 1

Calling syntax: CALL Zap

Input parameters: (none)

Output parameters: (none)

Required Input and Expected Results

The subprogram asks for the mass storage specifier. Pressing CONTINUE will cause the msus to be set to the default displayed. It then warns you to make sure the correct disc is installed. When you are ready to go on, simply press CONTINUE.

Special Considerations and Programming Hints

1. Keep in mind that this subprogram does not initialize a new disc. It only gives a used disc the appearance of being re-initialized by placing a −1 in the file type field of the first directory entry to denote the logical end of the directory.
2. IMPORTANT: Make sure you have a disc installed that can be "ZAPped". Once this subprogram is executed, any directory entries previously on the disc will not be retrievable through ordinary means.
3. Unexpected or incomplete results could occur if the subprogram is stopped before execution completes.

Error Messages

This subprogram tries to trap the more common error situations, allow you to correct them and continue without stopping the program. If, however, an error occurs which the program was not prepared to handle, do not press any key on the keyboard until you have determined the exact nature of the error.

Chapter 3
LIF Volume Label Utilities

Introduction

The programs in this chapter are to assist you in your dealings with the Logical Interchange Formatted (LIF) volume label on your disc. The first program, INITIALIZE, enables you to specify a meaningful volume label or any LIF disc or to initialize a disc and specify both its volume label and its directory length. The second program in this chapter, VERIFY LIF, checks the volume label of a disc and reports whether the disc meets LIF standards.

Extended Mass Storage Media Initialize (INITIALIZE)

Description

This program allows you to specify a meaningful volume label for any disc conforming to Hewlett-Packard's Logical Interchange Format (LIF) standards. (For information on LIF standards see the Special Considerations in the PHYREC section of Chapter 1.) This program also enables you to initialize a disc and specify its directory length.

How to Use

File name: INITIALIZE, disc 1
Also uses: PHYREC, disc 1

Type: LOAD "INITIALIZE"
Press: [CONTINUE]

When the asterisk ("*") in the lower right corner of the screen disappears, indicating that the program is loaded,

Press: [RUN]

The program prompts for several actions.

Required Input and Expected Results

1. The program asks you to input the mass storage unit specifier. Enter the MSUS of your disc (i.e., ":HP9895,707,1" for the HP 9895 dual disc drive.) Then press [ENTER]. Pressing [ENTER] or [CONTINUE] with no entry causes the MSUS to be set to the default displayed.
2. Install the proper mass storage media and press [CONTINUE].
3. The program asks if you wish to initialize the disc and displays the following softkey labels:

   YES, NO, and EXIT.

   The results of pressing a labeled softkey are listed below.

   a. YES ([k5]):

      If the media was previously initialized, then the program catalogs the directory and asks if it is okay to continue. You are given the following three softkey options:

      - [k5], labeled OKAY, which causes the program to initialize the disc and continue normal program execution;
      - [k6], labeled RESTART, which starts the program over; and
      - [k9], labeled EXIT, which stops program execution.

      If the media was not previously initialized, then the program enters the initialization process immediately after YES (k5) is pressed.

b. NO (k6):
The program asks if you want to change the volume label and gives three softkey options, YES(k5), NO (k6) and EXIT (k9). Pressing either softkey k6 or k9, stops program execution. Pressing softkey k5, causes the program to prompt you for a volume label. You may either enter a proper volume label (six or less characters, consisting of numbers and uppercase letters where the first character is a letter), or you may press CONTINUE, and the program assigns a volume label of " " (6 blanks). Once a volume label has been assigned, the program stops.

c. EXIT (k9):
Program execution is ended.

4. If you choose to initialize the media, then, when the initialization process is completed, the program will prompt you to input a volume label. You may either enter a proper volume label (six characters or less, consisting of numbers and uppercase letters where the first character is a letter), or you may press CONTINUE, and the volume label will default to " " (6 blanks). The program then prompts you to input the directory length. You may either enter a proper directory length (see Special Considerations), or you may press CONTINUE, and the directory length will default to 14 physical records. Once a directory length has been assigned, the program stops.

Special Considerations and Programming Hints

1. To allow for future support of new disc drives on your computer, this program will create a directory of any length greater than zero and less than 231 records long. It is up to you to avoid creating a directory that will consume your entire disc.
2. The interleave factor used is the optimum factor for the specified mass storage device. (See discussion of interleave factors in the BASIC Programming Techniques manual.)

Error Messages

This program tries to trap most common errors. The program informs you of the type of error trapped and returns to where the error was made so you may try again. If a unexpected error is trapped, the program reports the error number and aborts. Should you encounter an un-trapped error, check that the correct key combination was pressed (for example, often times EXECUTE is pressed rather than ENTER or CONTINUE). If you cannot discern the cause of the error or an acceptable correction, consult your HP sales representative.

Verify Logical Interchange Format (VERIFY_ LIF)

Description

This program reads record zero on your mass storage media and checks it against Hewlett-Packard's Logical Interface Format (LIF) standards (For information on LIF standards, see the section on PHYREC in Chapter 1).

How to Use

File name: VERIFY_LIF
Also uses: PHYREC

Type: LOAD "VERIFY_LIF"
Press: EXECUTE

When the asterisk ("*") in the lower right corner of the screen disappears, indicating that the program is loaded,

Press: RUN

The program prompts you to install the proper disc.

Required Input and Expected Results

1. Install the proper media and press CONTINUE. (The mass storage unit specifier defaults to the mass storage unit set on your machine before the start of this program, or you may execute a MASS STORAGE IS command before pressing CONTINUE.)
2. The program displays a line indicating whether or not your disc's volume label meets Logical Interchange Format standards.

Error Messages

This program does not attempt to trap any errors.

Chapter 4
Media Backup Utilities

Introduction

The complete disc backup and the selective file backup programs in this chapter allow you to copy any or all of your valuable disc files using a single disc drive. (This includes your BASIC system language disc if you have a RAM-based system.)

Complete Disc Backup (CBACKUP)

Description

This program allows you to back up the entire contents of any Series 200 flexible disc or any 5¼", 3½" or 8" disc conforming to the Logical Interchange Format (LIF) used by other Hewlett-Packard mass storage device implementations. The program is intended for use when only one disc drive is available. (The COPY statement should be used when two disc drives are available.) The program reads as much information from the master disc into memory as possible, then asks you to insert the backup disc. It then writes the information from memory to the backup disc. The disc exchange process continues until all information on the master disc has been copied to the backup disc. The more memory installed in your computer, the fewer disc exchanges required to backup a disc.

How to Use

File name: CBACKUP, disc 1
Subprogram files: CAT, disc 1

Type: LOAD "CBACKUP"
Press: EXECUTE

When the asterisk ("*") in the lower right corner of the screen disappears, indicating that the program is loaded,

Press: RUN

The program goes through an initialization process and then prompts you for several inputs.

Note

Do not remove BASIC Utilities disc until a message indicates that you can do so.

Required Input and Expected Results

1. CHECK READ, as explained also by the program, is a function by which you can have the information written to your backup disc verified for accuracy. This increases total copy time by approximately 50% or slightly more.
2. Each time a disc is inserted you are required to press CONTINUE so the program knows you are ready to have that disc read from or written to.

CAUTION

BE CAREFUL **NOT** TO STRIKE THE RUN KEY WHILE THE PROGRAM IS ALREADY RUNNING. (SEE SPECIAL CONSIDERATION #4.)

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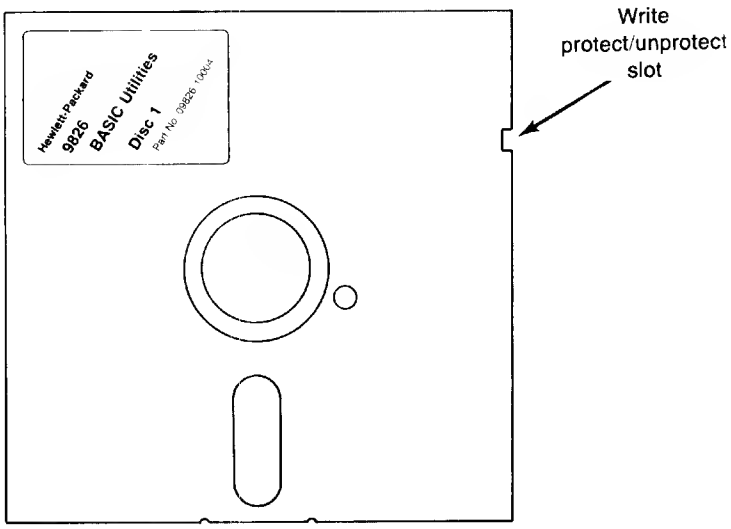
3. After the master disc has been completely copied to a backup disc, the program asks if you want to repeat the copy process to another disc. If so, the program restarts. Otherwise, the program stops.
4. The result of this program is a backup disc which is identical to the disc from which it was copied.

Special Considerations and Programming Hints

1. It is strongly suggested that you place a write-protect sticker over the protect/unprotect slot on the master disc. (See diagram.) This will assure that nothing extraneous or erroneous is written on the master disc.



2. The program implements the CHECK READ function by reading back what was just written to the disc and comparing it to what had been read from the master disc. If a check read error occurs, the master is read again, the backup is written to again and the two are compared. If it fails a second time, an error is flagged, a message printed and the program stops. By examining the variables Start and Stop (e.g., Type: Start; Press; EXECUTE), you can determine the range of record addresses within which the error occurred. You should determine if there is some reason, such as disc defect, either on the master disc or the backup disc, why the program cannot do an exact read and write.
3. If for some reason you stop the program before normal termination and wish to restart it by pressing RUN, you should first make sure the BASIC Utilities disc 1 is inserted correctly in the disc drive. You will have to start the copy process from the very beginning.
4. If you accidentally press RUN while the program is paused or waiting for input, stop the program immediately by pressing STOP (SHIFT CLR I/O) or PAUSE. Since pressing RUN causes all variables to become reinitialized, you will have to start the copy process from the very beginning. To do this, read and execute the directions contained in point #3 above.
5. Unexpected or incomplete results will occur if you stop this program or fail to complete the copy process.
6. This utility is not intended for use with SRM (MSI":REMOTE").

Error Messages

This program tries to trap the more common error situations, allow you to correct them and continue gracefully without detriment to the running program. If, however, an error occurs which the program was not prepared to handle, do not press any key on the keyboard until you have determined the exact nature of the error. Often times the wrong key combination was pressed (e.g., EXECUTE was pressed instead of the CONTINUE). Try to remember what your last few keystrokes were before receiving the error and correct them. If the cause of the error was something other than misplaced keystrokes and you cannot discern its cause or an acceptable correction, start the program over from the very beginning:

Type: SCRATCH A
Press: EXECUTE
Type: LOAD "CBACKUP"
Press: EXECUTE

After the program is loaded, press RUN

Selective File Backup (FBACKUP)

Description

This program allows you to back up file by file portions of any Series 200 flexible disc or any 5¼", 3½" or 8" disc conforming to the Logical Interchange Format (LIF) used by other Hewlett-Packard mass storage device implementations. The program is intended for use when only one disc drive is available. (The COPY statement should be used when two disc drives are available.) The program reads as many files or portions of files into memory as possible, then asks you to insert the backup disc. It then writes the information from memory to the backup disc. The disc exchange process continues until all specified files from the master disc have been copied to the backup disc.

How to Use

File name: FBACKUP, disc 1
Subprogram files: CAT, CREATE, disc 1

Type: LOAD "FBACKUP"
Press: [EXECUTE]

When the asterisk ("*") in the lower right corner of the screen disappears, indicating that the program is loaded,

Press: [RUN]

The program goes through an initialization process and then prompts you for several inputs.

Note

Do not remove BASIC Utilities disc until a message indicates that you can do so.

Required Input and Expected Results

1. CHECK READ, as explained also by the program, is a function by which you can have the information written to your backup disc verified for accuracy. This increases total copy time by approximately 50% or slightly more.
2. After you insert the master disc, the program asks you to input the names of the files you want copied. You can terminate this input sequence by pressing [CONTINUE] with no entry in the input line of the screen. If a file name is invalid (i.e., cannot be found in the master disc's directory), the program asks you to input the name again or omit it by pressing [CONTINUE] with no entry.
3. Each time a disc is inserted you are required to press CONTINUE so the program knows you are ready to have that disc read from or written to.

CAUTION

BE CAREFUL **NOT** TO STRIKE [RUN] WHILE THE PROGRAM IS ALREADY RUNNING. (SEE SPECIAL CONSIDERATION #5.)

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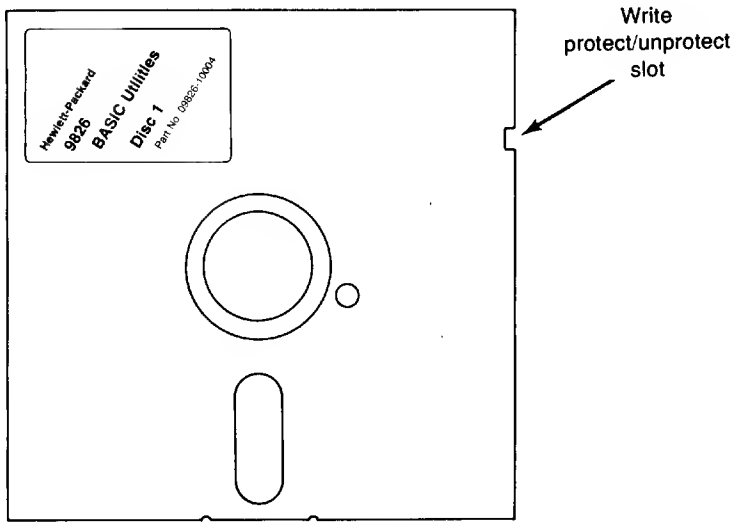
4. The result of this program is a backup disc containing a second copy of vital program or data files.

Special Considerations and Programming Hints

1. It is strongly suggested that you place a write-protect sticker over the protect/unprotect slot on the master disc. (See diagram.) This will assure that nothing extraneous or erroneous is written on the master disc.



2. Although this program will work with any disc conforming to Hewlett-Packard's Logical Interchange Format standard, the program is presently limited to requesting up to 112 files to be copied.
3. Do not use FBACKUP to copy the BASIC language system disc. The directory on this disc contains information needed on the backup disc. Therefore, use CBACKUP instead of FBACKUP.
4. The program implements the CHECK READ function by reading back what was just written to the disc and comparing it to what had been read from the master disc. If a check read error occurs, the information is rewritten to and then reread from the backup disc. This information is compared a second time to that which was read from the master disc. If a second check read error occurs, a message is printed and the file is purged from the backup disc. If more than one check read error occurs while copying files, either the master or the backup disc may be old and wearing out or generally defective.
5. If for some reason you stop the program before normal termination and wish to restart it by pressing RUN, you should first make sure the BASIC Utilities disc 1 is inserted correctly in the disc drive. You will have to start the copy process from the very beginning.
6. If you accidentally press the RUN key while the program is paused or waiting for input, stop the program immediately by pressing [STOP] ([SHIFT] [CLR I/O]) or [PAUSE]. Since by pressing [RUN] you have caused all variables to become reinitialized, you will have to start the copy process from the very beginning. To do this, read and execute the directions contained in point #4 above.
7. Unexpected or incomplete results will occur if you stop this program or fail to complete the copy process.
8. This utility is not intended for use with SRM (MSI":REMOTE").

Error Messages

This program tries to trap the more common error situations, allow you to correct them and continue gracefully without detriment to the running program. If, however, an error occurs which the program was not prepared to handle, do not press any key on the keyboard until you have determined the exact nature of the error. Often the wrong key combination was pressed (e.g., EXECUTE was pressed instead of CONTINUE). Try to remember what your last few keystrokes were before receiving the error and correct them. If the cause of the error was something other than misplaced keystrokes and you cannot discern its cause or an acceptable correction, start the program over from the very beginning:

Type: SCRATCH A
Press: EXECUTE
Type: LOAD "FBACKUP"
Press: EXECUTE

After the program is loaded, press RUN and follow the instructions given on the previous pages.

Chapter 5
File Management Utilities

Introduction

This chapter contains two programs to assist you in your dealings with files on mass storage media. The first program, REPACK, packs all the files on a disc to the front, freeing up all available disc space. The second program, FILE_SIZER, enables you to programmatically adjust the size of data files.

Mass Storage File Repack (REPACK)

Description

This program repacks files to the first records on the disc, leaving all free space at the end. It also repacks the directory, filling in any empty entries left by purged files and leaving any unused entries at the end of the directory. Since this program writes over the files on your disc, it is recommended that you back up your disc before running this program.

How to Use

File name: REPACK, disc 1
Also uses: PHYREC, disc 1

Type: LOAD "REPACK"
Press: EXECUTE

When the asterisk ("*") in the lower right corner of the screen disappears, indicating that the program is loaded,

Press: RUN

The program prompts for several actions and then displays an extended catalog of the mass storage media.

Required Input and Expected Results

1. Install the proper disc and press CONTINUE. (The mass storage unit specifier will default to the mass storage unit set on your machine before the start of this program, or you may execute a MASS STORAGE IS command before pressing CONTINUE.)
2. The program displays a softkey menu and an extended catalog of the directory of your disc. Arrows will appear alongside of the directory entries of any purged files (These will be completely wiped out if you continue the program – see Special Considerations). If at this point you decide you do not want to repack a disc, then press the softkey labeled EXIT (k9). If you wish to repack a different media at this time, press the softkey labeled RESTART (k6), and the program will start over. Otherwise, press the softkey labeled OKAY (k5).
3. Once the OKAY key (k5) has been pressed, the program repacks the disc, displaying the names of the files being repacked. If you wish to abort the repack at this point, press the softkey labeled EXIT (k9). After the repack is complete, the program will ask if you want to repack another disc. Press the softkey labeled YES (k5) to continue or the softkey labeled NO (k6) to exit the program.

Special Considerations and Programming Hints

1. Since this program fills up all available space at the front of the media and its directory, any purged files and their directory entries will be wiped out by this program, and will therefore be unrecoverable. Purged files are indicated by arrows at the left side of the extended directory catalog.
2. If the directory on your media does not have an end of directory marker, then the program will list out a series of purged programs with null file names. These are caused by the zeros which fill in the rest of the directory and may be ignored.

Error Messages

This program attempts to trap and recover from most common errors. Should you encounter an untrapped error, check that the correct key combination was pressed (for example, often times [EXECUTE] is pressed rather than [ENTER] or [CONTINUE]). If you cannot discern the cause of the error or an acceptable correction, consult your HP sales representative.

Adjust Data File Size (FILE_SIZER)

Description

This program allows you to shrink and enlarge ASCII and BDAT files. It also finds the end of data in your file and allows you to shrink your file to fit the data.

How to use

File name: FILE_SIZER, disc 1
Also uses: PHYREC, disc 1

Type: LOAD "FILE_SIZER"
Press: [RUN]

When the asterisk ("*") in the lower right corner of the screen disappears, indicating that the program is loaded,

Press: [EXECUTE]

The program then prompts for several actions and displays a catalog of your disc.

Required Input and Expected Results

1. Install the proper disc and press [CONTINUE]. (The mass storage unit specifier defaults to the mass storage unit set on your machine before the start of this program, or you may execute a MASS STORAGE IS command before pressing [CONTINUE].)
2. The program prompts you to input the name of the ASCII or BDAT file you wish to change. Type in the file name and press [ENTER] or [CONTINUE]. At any input prompt in this program you may press [CONTINUE] or [ENTER] with no entry to abort the program.
3. The program asks if you want to specify your file size or make the file size fit your data. The following softkey labels are displayed:

   SPECIFY, FIT DATA, and EXIT.

   The results of pressing a labeled softkey are listed below.

   a. SPECIFY ([k5]):

      The program prompts you for the new file length. If your file is a BDAT file, then the number of records requested is in terms of defined records. ASCII file lengths are always in terms of physical records (256 bytes). If your file is an ASCII file and you specify a length less than that required to contain data already in your file, then the program displays an error message and asks you to enter a new file length or a new file name. If your file is a BDAT file and you specify a length less than that necessary to contain your data, the program displays a warning and gives you the option to either enter a new file length, enter a new file name, exit, or continue, destroying some of your data.

   b. FIT DATA ([k6]):

      The program finds the last sector of your file which contains data, and moves the end of the file to the end of that sector.

   c. EXIT ([k9]):

      Program execution is ended.

Special Considerations and Programming Hints

1. This program does not allow for ASCII files to be shrunken too small to contain their data.
2. If you press the FIT DATA key when the specified file contains no data, then the program shrinks the file to one defined record for BDAT files and one physical record for ASCII files.
3. If you accidentally press [RUN] or stop execution of this program after the sizing process has begun, you may encounter unexpected results.
4. This utility is not intended for use with SRM (MSI":REMOTE").

Error Messages

This program tries to trap most common errors. The program informs you of the type of error trapped and returns to where the error was made so you may try again. If an unexpected error is trapped, the program reports the error number and aborts. Should you encounter an untrapped error, check that the correct key combination was pressed (for example, often times [EXECUTE] is pressed instead of [ENTER] or [CONTINUE]). If you cannot discern the cause of the error or an acceptable correction, consult your HP sales representative.

Chapter 6
System Management Utilities

Introduction

This chapter contains a program that displays system configuration and ROM revision identification (CONFIG), a subprogram that returns system information to your application program (SYSTEM) and a program that assists you when you encounter an Error 1 during a program load (HELP).

System Configuration and ROM Revision Identification (CONFIG)

Description

This subprogram displays system configuration including whether hard (built-in using read-only memory or ROM) or soft (on disc) BASIC is installed, system and ROM revision identifiers, what option ROMs and binary programs are present and what interface cards are installed. Specific information can be displayed for each interface card.

How to Use

Subprogram File: CONFIG, disc 2

Calling Syntax: CALL Config

With your current program in memory,

Type: LOADSUB ALL FROM "CONFIG"
Press: EXECUTE

Insert the statement "CALL Config" somewhere in your program.

The CONFIG file contains a driver for the subprogram, so if you want to run it as a stand alone program,

Type: LOAD "CONFIG"
Press: EXECUTE
Press: RUN

Required Input and Expected Results

1. There are no input or output parameters.
2. Once Config has been called, the subprogram displays general configuration information. It then prompts you to specify whether or not you want specific information about the interface cards installed. If you press the softkey labeled NO, the subprogram returns to the main program.
3. The rules for system and ROM revision identifiers are as follows: There is one system revision associated with a system (A,B,C,etc.) and two ROM revision identifiers associated with each ROM pair (ROMs are always in pairs, numbered 1 and 2, 3 and 4, etc.). One or both members of a pair can be revised; eg., from A to B. Even though ROMs may be revised, the system revision will not change unless at least half of the ROMs are revised.
4. Although soft BASIC does not actually have ROMs, ROM revision identifiers are present to be consistent with hard BASIC. If both hard and soft BASIC are installed, Config will display information about soft BASIC.

Special Considerations and Programming Hints

This program can serve a number of purposes:

1. If you are getting system errors and wish to consult your HP sales representative, first get a printout of your system configuration by running the Config subprogram.
2. If you want to know whether a binary program is attached to one of your STOREd programs, perform the following steps:

   Type: SCRATCH A
   Press: [EXECUTE]
   Type: LOAD "*your program*"
   Press: [EXECUTE]
   Type: LOADSUB ALL FROM "CONFIG"
   Press: [EXECUTE]

   CALL Config from your program. Config will display names of any binary programs that are present.

   Binary programs such as PHYREC use up space on your disc when they are STOREd with a program file. (Non-scratchable binaries such as the Shared Resource Management Binary cannot be STOREd with a program file.) If your program does not use the binary programs, you can get rid of them by performing the following steps:

   Type: LOAD "*your program*"
   Press: [EXECUTE]
   Type: SAVE "*temp name*"
   Press: [EXECUTE]
   Type: SCRATCH A
   Press: [EXECUTE]
   Type: GET "*temp name*"
   Press: [EXECUTE]
   Type: RE-STORE "*your program*"
   Press: [EXECUTE]
   Type: PURGE "*temp name*"
   Press: [EXECUTE]
3. Config is structured modularly to allow you to use portions of it in your own programs. For instance, the specific information about each interface card might be useful in an I/O application.
4. A portion of Config is secured. To insure proper operation, it should not be altered.

Error Messages

This program attempts to trap and recover from most common errors. Should you encounter an untrapped error, check that the correct key combination was pressed (for example, often times [EXECUTE] is pressed rather than [ENTER] or [CONTINUE].) If you cannot discern the cause of the error or an acceptable correction, consult your HP sales representative.

If you try to RUN this CONFIG subprogram on the BASIC 1.0 operating system, the subprogram prints "This CONFIG program does not work in BASIC 1.0 and displays "CONFIG ABORTED."

System Information Subprogram (SYSTEM)

Description

This subprogram returns the following information about your computer system: alpha display width, graphics resolution, whether or not your computer has screen highlights, number of internal disc drives, mass storage unit specifier (msus) and what binary programs are present. You can use the information returned from the subprogram in your application program.

How to Use

Subprogram File: SYSTEM, disc 2

Calling Syntax: CALL SYSTEM (Alpha,Graphics,Highlights,Drives,Msus$,Bin(*))

Output Parameters:

Alpha	Real variable that contains the number of characters wide your computer's display is; eg., 50 for a 50-character wide display.
Graphics	Real variable that contains the x-axis value of the graphics resolution; eg., 400 for a display with graphics resolution of 400 x 300.
Highlights	Real variable that contains whether or not your computer has screen highlights: 0 - Screen highlights not present 1 - Screen highlights present
Drives	Real variable that contains the number of internal disc drives.
Msus$	String variable that contains the mass storage unit specifier (msus) set on your computer.
Bin(*)	Real array that contains whether or not certain binary programs are present. A value of 1 returned in a specific element signifies that a specific binary program is present. No distinction is made between scratchable binaries (eg., Phyrec) and non-scratchable binaries (eg., Shared Resource Management Binary). Following is a list of Bin(*) elements and corresponding binary program names. Bin(1) BASIC Extensions 2.0 (AP 2.0) Bin(2) Shared Resource Management Bin(3) Color Video Interface (HP 98627A) Bin(40) Phyrec All other elements of Bin(*) will be returned as 0. The Bin array is implicitly dimensioned to 10 elements to allow for use with future binary programs.

Required Input and Expected Results

1. Msus$ returns the mass storage unit specifier(msus) set by executing a MASS STORAGE IS statement. After a power-up or SCRATCH A, the MASS STORAGE IS device is set to ":INTERNAL". If you are using the BASIC Extensions 2.0 (AP 2.0) binary, the System subprogram may return a different msus than the one you entered by executing the MASS STORAGE IS statement. For example, if you type MSI ":HP9135,700,1", the value returned in Msus$ will be ":HP9895,700,1". This is not an error; the subprogram simply returns the specific msus instead of the more generic msus that you specified.
2. If you have declared a Shared Resource Management path-name as your msus, the value of Msus$ returned by the System subprogram is ":REMOTE"; no path-name is returned.

Special Considerations and Programming Hints

1. A portion of the System subprogram is secured. To insure proper operation, do not alter the program.
2. The file "SYSTEM" contains a driver as well as the subprogram System so that you can LOAD "SYSTEM" and RUN it as a stand-alone program.

Error Messages

This program does not attempt to trap any errors.

Recovery From Error 1 on LOAD (HELP)

Description

This program displays which BASIC operating system is installed and loads the correct PHYREC binary. The PHYREC binary that runs on BASIC 1.0 (options 001 and 701) is different from that which runs on BASIC 2.0. If you try to LOAD a program with the wrong PHYREC appended to it, you will get an Error 1. You can recover from the error by running HELP which loads PHYREC1 if BASIC 1.0 is installed and PHYREC2 if BASIC 2.0 is installed.

How to Use

File name: HELP, disc 2
Also uses: PHYREC1, PHYREC2, disc 2

Type: LOAD "HELP"
Press: [EXECUTE]

When the asterisk (*) in the lower right corner of the screen disappears, indicating that the program is loaded,

Press: [RUN]

The program displays which BASIC is installed and performs LOAD BIN "PHYREC1" or LOAD BIN "PHYREC2".

Required Input and Expected Results

No inputs are required.

Special Considerations and Programming Hints

1. Note that a portion of the program is secured.
2. If you LOAD a program that contains a scratchable binary (e.g., PHYREC), then try to LOAD BIN a non-scratchable binary, (e.g., Shared Resource Management Binary), you will encounter an Error 1. HELP does not recover from this error. You must LOAD BIN a non-scratchable binary prior to LOADing any program that contains a scratchable binary.

Error Messages

This program attempts to trap and recover from most common errors. Should you encounter an untrapped error, check that the correct key combination was pressed. (For example, often times [EXECUTE] is pressed rather than [ENTER] or [CONTINUE].) If you cannot discern the cause of the error or an acceptable correction, consult your HP Sales Representative.

List Files (LISTER)

Description

This program lists either one file or a number of files which are in the form of ASCII[1] strings (as a result of either being a SAVEd file or OUTPUT as a series of ASCII strings). It provides a number of parameters such as printer select code, pagination, lines per page, page width, page numbering and several more to help format your documentation. It can even strip off line numbers and exclamation marks ("!") allowing you to use the program editor as a very simple text editor. Most parameters have default values associated with them so that the listing process can be as simple or as detailed as you wish.

How to Use

File name: LISTER, disc 2
Subprogram files: CAT, disc 2

Type: LOAD "LISTER"
Press: EXECUTE

When the asterisk ("*") in the lower right corner of the screen disappears, indicating that the program is loaded,

Press: RUN

The program goes through a short initialization process, then provides a menu of parameters for you to change at your discretion.

1 American Standard Code for Information Interchange

Required Input and Expected Results

You are asked first of all to input a list of file names to be printed out. After the program has verified that these files exist and are of the file type ASCII, it displays a menu of parameters. The following parameters as they appear in the menu have these associated default values:

→	START PRINTING	
	Device Selector	701
	Paging	YES
	Perforation	YES
	Lines per page	63
	Spacing	SINGLE
	Omit page numbers	NO
	First page number	1
	Print range	1,ALL
	Trailer	
	Edit text	NO
	Width	80
	No. of listings	1
	EXIT	

You can move a horizontal arrow through this menu using the cursor wheel ("the knob") and select an item by positioning the arrow, then pressing the SELECT softkey (k5).

Device Selector This is the device selector of the printer on which the listings will appear. The default is interface select code 7, primary address 1. If your printer matches this setting, you can omit this parameter. Otherwise, after selecting this parameter, enter the proper device selector for your printer and press CONTINUE.

Paging This parameter is "toggled" each time you select it. In other words, the default setting for paging is "YES" but is toggled to "NO" upon selection. If selected again, it will be reset to "YES". With paging turned on (set to "YES"), you get 11-inch length pages. With it turned off, you will get one continuous listing, demarcated only when ending one file and starting another. (Instructions are included in Special Considerations and Programming Hints for varying the lister program for use with 8.27 x 11.69 inch paper.)

Perforation With perforation set to "NO" the program prints a row of underline characters so you will know where to cut the pages apart on continuous paper. If the parameter is set to "YES", the program assumes the printer contains perforated paper.

Lines per page You can effectively set your top and bottom margin widths by specifying the number of lines to be printed per page. Default is 63 lines per page.

Spacing Line spacing for most listings will probably be "SINGLE", but occasionally you may wish to set this parameter to "DOUBLE". Essentially, the program just prints a blank line following each line of text.

Omit page numbers Although this parameter is set to "NO" indicating that page numbers are desired, you can toggle it and suppress page numbering.

First page number The program normally begins numbering pages at "1", but if what you are printing is a continuation of a previous listing, you can designate via this parameter the number at which you wish to begin numbering.

Print range This feature allows you to selectively print out any given range of pages. Any pages falling outside the specified range will not be printed. Upon selecting this parameter, the program asks you to enter a low page number and a high page number. If you wish to disable the selective print range feature, you merely type in ALL for the low page number. Likewise, ALL can be entered as the high page number if the entire text after a certain point is desired.

Note

To find the correct page number to start printing on, the program goes through the same amount of work that it would to print the entire report; it just doesn't actually print out any lines until it reaches the right page number.

Trailer This item allows you to enter any arbitrary string which will appear at the bottom of every page on the same line as the page number. Normally, the page number is centered within the designated page width (see Width parameter) and the trailer is centered to the right of the page number. Therefore, the length of the trailer should be no more than half the specified Width (minus a couple of characters to allow for the page number). Some example trailers might be "PRELIMINARY VERSION", "DO NOT PHOTOCOPY", or "CONFIDENTIAL".

Edit text This feature, when set to "YES", causes the program to delete line numbers and exclamation marks ("!") from programs so that you can use the program editor as a text editor. In other words, with Edit text turned on:

```
10 ! This document is designed to explain the use of the LIST
20 ! FILES program of the BASIC Utilities package.
```

becomes:

This document is designed to explain the use of the LIST
FILES program of the BASIC Utilities package.

Width Default line width is 80 characters. This can be adjusted anywhere from 1 to 132 characters per line.

No. of listings You can specify as many listings as you wish although the default number is 1.

EXIT This parameter allows you to leave the menu and either start the program over or terminate it.

After you select START PRINTING, the program asks you to line up the top of form for perforated paper. After pressing [CONTINUE], the program is ready to begin printing.

This program lists as many as 112 files according to your specifications. The result is clean, neat, organized program documentation or personalized text.

Special Considerations and Programming Hints

1. Although this program works with any disc conforming to Hewlett-Packard's Logical Interchange Format standard, the program is presently limited to requesting up to 112 files to be listed.
2. The listing specification parameters are set for all the files you have entered to be listed. If you want to vary the printing format, input only those files which use the same format. After they are printed, enter the next group of files and set up the print parameters for them. Also, all files entered should reside on one disc. The program makes no provision for switching discs.
3. If you accidentally press [RUN] while the program is paused or waiting for input, stop the program immediately by pressing STOP ([SHIFT] [CLR I/O]) or [PAUSE]. Since pressing [RUN] causes all variables to become reinitialized, you will have to start the program from the very beginning.
4. In order to use the lister program with 8.27 x 11.69 inch paper, proceed with the following instructions:

	Maximum Lines	Form-feed Space
9876A		
8½ x 1	70	7
8.27 x 11.69	74	10
2631A/G		
8½ x 11	66	8

Determine the maximum number of lines that will fit on a page (from perforation to perforation) from your printer and the number of blank lines left when crossing a perforation while doing a simple "no frills" listing. Edit lines 380 and 390 of file "LISTER" with these new values.

a. If file LISTER is not yet loaded into memory,

   Type: LOAD "LISTER"
   Press: [EXECUTE]

   Proceed with step d.

b. If file LISTER is loaded, but [RUN] has not been pressed, proceed with step d.

c. If file LISTER is loaded and currently running,

   Press: [PAUSE] or STOP ([SHIFT] [CLR I/O])

   Proceed with step d.

d. Edit LISTER by,

   Type: EDIT 380
   Press: [EXECUTE]
   Change: Maxlines = 66 to Maxlines = *max lines per page*
   Press: [ENTER]
   Change: Linesperpage = 60 to Linesperpage = *Ff_space = 7 to Ff_space = form-feed space*
   Press: [ENTER]
   Press: [PAUSE]

e. If you wish to make this a permanent change,

   Press: [PAUSE]
   Type: RE-STORE "LISTER"
   Press: [EXECUTE]

You are now ready to run program LISTER.

5. This utility is not intended for use with SRM (MSI":REMOTE").

Error Messages

This program tries to trap the more common error situations, allow you to correct them and continue gracefully without detriment to the running program. If, however, an error occurs which the program was not prepared to handle, do not press any key on the keyboard until you have determined the exact nature of the error. Often the wrong key combination was pressed (e.g., [EXECUTE] was pressed instead of [CONTINUE]). Try to remember what your last few keystrokes were before receiving the error and correct them. If the cause of the error was something other than misplaced keystrokes and you cannot discern its cause or an acceptable correction, start the program over from the very beginning by simply pressing [RUN].

Cross Reference Generator (XREF)

Description

Given a valid file name, this program will cross reference all variable or array names and all statement labels for the main program segment and each subprogram. This program allows you to cross reference a single file or up to 112 files in one run. In addition, you can designate only portions of files to be cross referenced. Note that any file to be cross referenced needs to be of the type ASCII. This is accomplished by SAVEing the file rather than STOREing it. (If using BASIC Extension 2.0, the command XREF is available and more efficient that this utility.)

How to Use

File name: XREF, disc 2

Type: LOAD "XREF"
Press: EXECUTE

When the asterisk ("*") in the lower right corner of the screen disappears, indicating that the program is loaded,

Press: RUN

The program goes through a short initialization process and then prompts you for several inputs.

Required Input and Expected Results

Several of the input prompts give a default value. If you wish to use this default value, proceed by pressing CONTINUE with no entry in the input line of the screen. The following is a clarification of the types of input needed by the program.

The **printer select code** indicates the destination of the printed cross reference map. The default is interface select code 7, primary address 1 (701). If your printer matches this setting, you can CONTINUE past this prompt. Otherwise, enter the proper device selector for your printer and press CONTINUE.

The default **line width** is 80 characters. However, this can be adjusted to some multiple of 5 between 40 and 130, inclusive.

When you type in the **names of the files** you wish to have cross referenced, follow each name with a press of [CONTINUE]. After all names are entered, press [CONTINUE] once more with no entry in the input line of the screen.

Next, you're asked if you want a **cross reference of the entire file** of every file entered. If not, the program displays each file name in turn and asks for the beginning line number and ending line number denoting the segment of the program file to be cross referenced.

Finally, the program asks you for the current **date** which will be printed at the beginning of each cross reference listing.

The program checks to make sure each file is present and of the type ASCII. If a problem arises, a message is printed and the file is omitted. Otherwise, the program will cross reference the file.

This program will cross reference as many as 112 files for neat, clean program documentation and simplified debugging.

Special Considerations and Programming Hints

1. Since pressing [RUN] causes all variables to become reinitialized, if you accidently press [RUN] while the program is paused or waiting for input, you will have to start the program from the very beginning.

Error Messages

This program tries to trap the more common error situations, allow you to correct them, and continue gracefully without detriment to the running program. If, however, an error occurs which the program was not prepared to handle, do not press any key on the keyboard until you have determined the exact nature of the error. Often the wrong key combination was pressed (e.g., [EXECUTE] was pressed instead of [CONTINUE]). Try to remember what your last few keystrokes were before receiving the error and correct them. If the cause of the error was something other than misplaced keystrokes and you cannot discern its cause or an acceptable correction, start the program over from the very beginning.

Secure Lines (SECURE)

Description

This subprogram prevents selected program lines from being listed; instead, an asterisk ("*") appears after the line number. The secured lines execute normally, however. If one line number is specified, only that line is secured. If two line numbers are specified, that block of lines is secured. If no line numbers are specified, the entire program is secured.

How to Use

Subprogram File: SECURE, disc 2

Calling Syntax: Secure [CALL is optional]
Secure(Line1, Line2)
Secure(Line)

You will want to secure selected lines of your program, then RE-STORE the program on your disc. However, before you RE-STORE your program, you should delete the Secure subprogram. A suggested sequence of events is:

Type: LOAD "*your program*"
Press: EXECUTE
Type: LOADSUB ALL FROM "SECURE"
Press: EXECUTE

Insert at the beginning of your program:

1 Secure (*your parameters*)
2 DELSUB Secure
3 STOP
Press: RUN

When the message "SECURE COMPLETED" appears at the bottom of the screen,

Type: DEL 1,3
Press: EXECUTE
Type: RE-STORE "*your program*"
Press: EXECUTE

Required Input and Expected Results

1. Input parameters are:

   No parameters – The entire program is secured.

   Line1 Real variable from the calling program that designates the first line number that is secured.

   Line2 Real variable from the calling program that designates the last line number that is secured.

   Line Real variable from the calling program that designates the only line number that is secured.

Special Considerations and Programming Hints

1. Note that most of the Secure subprogram is secured.
2. There is no provision made for "unsecuring" a program, so be sure to specify the line numbers accurately. However, a secured line can be deleted or replaced and then listed.
3. A program containing secured lines can be STOREd on your disc but not SAVEd.

Error Messages

The only error trapped by this program is that which occurs when you try to RUN the SECURE subprogram on the BASIC 1.0 operating system. The subprogram prints "This SECURE subprogram does not work in BASIC 1.0" and displays "SECURE ABORTED." (See the introduction to this manual for which BASIC Utilities you should use with your BASIC operating system.)

82905B Dump Graphics Subprogram (82905DUMP)

Description

Given a device selector, this subprogram dumps the graphics display memory to the 82905B printer. Since the 82905B does not print standard raster graphics, this subprogram performs efficient bit manipulation to standard raster graphics printer.

How to Use

Subprogram file: 82905DUMP, disc 2

Calling syntax:

CALL Graphics_dump (Device_selector)

Input parameters:

Device_selector Device selector of your 82905B printer

Output parameters: (None)

Required Input and Expected Results

No user interaction is necessary. The graphics display will be dumped and control returned to the driving program.

Special Considerations and Programming Hints

1. The amount of time required for execution of this subprogram is a little less than three minutes. All but about 1% of this time is due to the printer; the computation time is practically negligible.
2. In order to fit the graphics display on your paper when using a Model 36, manually adjust the left margin on your 82905B printer to the left edge of the paper.
3. This subprogram will work with 98627A Binary if you re-RUN your program after substituting PLOTTER IS 3,"INTERNAL" for any PLOTTER IS statements. (PEN statements will default to 1.)
4. This subprogram sets the PRINTER IS device to the device selector parameter passed to the subprogram. Therefore, you should reset your PRINTER IS device to 1 after the dump is completed if you want to print to the CRT.
5. This subprogram is secured. To insure proper operation, do not alter it.

Error Messages

This subprogram will terminate if the input parameter, Device_selector, is an incorrect printer address; control will return to the driving program. It is your responsibility to make sure the printer is an 82905B, as the subprogram performs no checking. No other errors are trapped programmatically by this subprogram.

Chapter 7
Programming Aids

Introduction

The programs in this chapter are to aid you in your programming effort. They will enable you to

- list files according to your specifications producing organized documentation or personalized text (LISTER).
- cross reference files for program documentation and simplified debugging (XREF), and
- secure program lines so they cannot be listed (SECURE).
- dump graphics to an HP 82905B printer (82905DUMP)

Chapter 8
Status Register Utilities

Introduction

The programs in this section list the status registers of

- ASCII and BDAT files (FILE_STAT)
- HP-IB Interface cards (HPIB_STAT)
- RS-232 Interface cards (RS232_STAT)
- GPIO Interface cards (GPIO_STAT)

Status of Data Files (FILE_STAT)

Description

This program prints a formatted listing of the contents of the status registers for a given ASCII or BDAT file.

How to Use

File name: FILE_STAT, disc 2

Type: LOAD "FILE_STAT"
Press: [EXECUTE]

When the asterisk ("*") in the lower right corner of the screen disappears, indicating that the program is loaded,

Press: [RUN]

The program prompts for several actions and displays a softkey menu.

Required Input and Expected Results

1. Install the proper disc and press [CONTINUE]. (The mass storage unit specifier defaults to the mass storage unit set on your machine before the start of this program, or you may execute a MASS STORAGE IS command before pressing [CONTINUE].)
2. The program asks for the name of your data file. Type in the name of an ASCII or BDAT file and press [ENTER]. Pressing [CONTINUE] or [ENTER] with no entry causes the program to abort.
3. The program prompts for the register you wish to check and displays a softkey menu. The keys will be labeled 1 through 6 for ASCII files and 1 through 8 for BDAT files. Softkey [k9] will be labeled EXIT in both cases; pressing [k9] stops program execution. Pressing a numbered softkey causes the program to display the correspondingly numbered status register of the specified file. The program returns to this menu after displaying each status register. For information on the meaning of the status registers, see the "Interface Registers" section of your BASIC Language Reference Manual.
4. Note: This utility is not intended for use with SRM (MSI":REMOTE").

Error Messages

This program tries to trap most common errors. The program informs you of the type of error trapped and returns to where the error was made so you may try again. If an unexpected error is trapped, the program reports the error number and aborts. Should you encounter an untrapped error, check that the correct key combination was pressed (for example, often times [EXECUTE] is pressed rather than [ENTER] or [CONTINUE]). If you cannot discern the cause of the error or an acceptable correction, consult your HP sales representative.

Status of HP-IB Interface (HPIB_STAT)

Description

This program prints a formatted listing of the contents of the status registers for the internal and external HP-IB interface card (part number HP 98626A).

How to Use

File name: HPIB_STAT, disc 2

Type: LOAD "HPIB_STAT"
Press: [EXECUTE]

When the asterisk ("*") in the lower right corner of the screen disappears, indicating that the program is loaded,

Press: [RUN]

The program prompts for several actions and displays a softkey menu.

Required Input and Expected Results

1. The program prompts you to specify the external or the internal HP-IB card, and displays the following softkey labels: EXT, INT, and EXIT. Pressing INT ([k5]) specifies the internal HP-IB interface, and pressing EXT ([k6]) specifies an external HP-IB interface. Pressing EXIT ([k9]) causes program execution to be stopped. If you specified an external interface then the program also prompts you to input the interface select code (ISC) of your HP-IB interface card. The ISC must be an integer greater than 7 and less than 32.
2. Once the internal or external interface has been specified, the program prompts you to input the number of the register you wish to check and displays a softkey menu. Softkeys [k0] through [k6] are labeled 1 through 7, respectively, and softkey [k9] is labeled EXIT. Pressing [k9] stops execution of the program. Pressing a numbered softkey causes the program to display the correspondingly numbered status register of the HP_IB interface card. The program returns to this menu after displaying each status register. For information on the meaning of the status registers, see the "Interface Registers" section of your BASIC Language Reference Manual.

Error Messages

This program tries to trap most common errors. The program informs you of the type of error trapped and returns to where the error was made so you may try again. If an unexpected error is trapped, the program reports the error number and aborts. Should you encounter an untrapped error, check that the correct key combination was pressed (for example, often times [EXECUTE] is pressed rather than [ENTER] or [CONTINUE]). If you cannot discern the cause of the error or an acceptable correction, consult your HP sales representative.

Status of RS-232 Interface (RS232_STAT)

Description

This program prints a formatted listing of the contents of the status registers for the RS-232 interface card (part number HP 98626A).

How to Use

File name: RS232_STAT, disc 2

Type: LOAD "RS232_STAT"
Press: EXECUTE

When the asterisk ("*") in the lower right corner of the screen disappears, indicating that the program is loaded,

Press: RUN

The program prompts for several actions and displays a softkey menu.

Required Input and Expected Results

1. The program prompts you to input the interface select code (ISC) of your RS-232 interface card. Type in the select code and press ENTER. The ISC must be an integer greater than 7 and less than 32.
2. The program then prompts you to input the number of the register you wish to check and displays a softkey menu. Pressing softkey k9, labeled EXIT, stops program execution. Softkey k5 is labeled "0 to 5"; softkey k6 is labeled "6 to 11". Pressing softkey k5 yields a new menu, wih k0 through k5 labeled 0, 1, 2, 3, 4, 5, respectively. Pressing softkey k6 yields a new menu, with k0 through k5 labeled 6, 7, 8, 9, 10, 11, respectively.

   Pressing one of these softkeys causes the program to display the correspondingly numbered status register of the RS-232 interface card. The program returns to this menu after diplaying each status register. For information on the meaning of the status registers, see the "Interface Registers" section of your BASIC Language Reference Manual.

Error Messages

This program tries to trap most common errors. The program informs you of the type of error trapped and returns to where the error was made so you may try again. If an unexpected error is trapped, the program reports the error number and aborts. Should you encounter an untrapped error, check that the correct key combination was pressed (for example, often times EXECUTE is pressed rather than ENTER or CONTINUE). If you cannot discern the cause of the error or an acceptable correction, consult your HP sales representative.

Status of the GPIO Interface (GPIO_STAT)

Description

This program prints a formatted listing of the contents of the status registers for the GPIO interface card.

How to Use

File name: GPIO_STAT, disc 2

Type: LOAD "GPIO_STAT"
Press: [EXECUTE]

When the asterisk ("*") in the lower right corner of the screen disappears. indicating that the program is loaded,

Press: [RUN]

The program prompts for several actions and displays a softkey menu.

Required Input and Expected Results

1. The program prompts you to input the interface select code (ISC) of you GPIO interface card. Type in the ISC and press [ENTER]. The ISC must be an integer greater than 7 and less than 32.
2. The program prompts for the number of the register you wish to check and displays a softkey menu. Softkeys [k0] through [k4] are labeled 1 through 5, respectively, and softkey [k9] is labeled EXIT. Pressing [k9] stops execution of the program. Pressing a numbered softkey causes the program to display the correspondingly numbered status register of the GPIO interface card. The program returns to the softkey menu after displaying each status register. For information on the meaning of status registers, see the "Interface Registers" section of your BASIC Language Reference Manual.

Error Messages

This program tries to trap most common errors. The program informs you of the type of error trapped and returns to where the error was made so you may try again. If an unexpected error is trapped, the program reports the error number and aborts. Should you encounter an untrapped error, check that the correct key combination was pressed (for example, often times [EXECUTE] is pressed rather than [ENTER] or [CONTINUE]). If you cannot discern the cause of the error or an acceptable correction, consult your HP sales representative.

Chapter 9
Series 200 Demonstration Package

Introduction

This section of the Utility Library contains the Series 200 demo routines. These routines reside on disc 3.

The purposes of the demo routines are:

1. to provide a way for you to demonstrate your computer to your manager or colleagues,
2. to familiarize you with the mechanics of running a program on your computer, and
3. to serve as an example in programming your computer.

The demo pack consists of a number of different programs which are swapped in and out of memory at your request through the use of softkeys. Below is a general set of instructions for running the demo pack. Detailed instructions for each demo program can be found in the section dedicated to that program. Following the explanation of Required Input for the demonstration package is a Summary of Demonstration Programs. It gives a demo program name, its purpose, the disc file it's found on, and any equipment it may use.

How to Use

File name: DEMO, disc3

Type: LOAD "DEMO"
Press: [EXECUTE]

When the asterisk ("*") in the lower right corner of the screen disappears, indicating that the program is loaded,

Press: [RUN]

A set of softkey labels will appear at the bottom of the screen. Directly in front of the screen are ten keys which correspond to the labels on the CRT. The top row of labels is for [k0] through [k4] and the bottom row of labels is for [k5] through [k9].

Required Input and Expected Results

1. Press one of the softkeys described above.
2. Depending upon the key pressed, either another set of softkey labels will appear, or a program will commence execution. In the first case, the labels indicate that you should make another selection.
3. Any program can be terminated by pressing the EXIT softkey, which will bring back the previous menu of softkeys.

Further instructions and explanations are left to the section pertaining to the particular demo desired.

Summary of Demonstration Programs

The demo subprograms do not require any equipment. However, to realize the full potential of the system being demonstrated, the equipment listed below is recommended.

Subprogram	File Name	Purpose	Equipment (opt.)
System_setup	DEMO	Poll all peripherals to find system configuration	
Filter	FILTER	Use the knob to vary component values and replot response curves for a filter circuit design.	Graphics printer
Mech	MECH	Draw a design for a mechanical part.	
Stressanal	STRESSANAL	Use the knob to move a load on a beam bridge and analyze the stresses.	
Fft	FFT	Fourier analysis of differing waveforms.	3437A Voltmeter, 3325A Function Generator or 8165A Signal Source and a graphics printer.
Emission	EMISSION	Plot emission control chart.	HP 9872, 7225, 7470 or 7580 plotter
Sys_test	SYSTEST	Present a production test model for evaluating per-unit test cost expenses.	Graphics printer
Motor_demo	MOTOR	Plot induction motor fields and phases.	HP 9872, 7225, 7470 or 7580 plotter
Statistics	STATISTICS	Demonstrate the regression analysis and residual analysis portions of the Statistics Library.	
Dow_jones	DOW_JONES	Draw sequential plots of Dow-Jones industrial averages over certain time periods.	
Forecasting	FORECAST	Demonstrate portions of the Forecasting applications package.	
Efile	EFILE	Display an immediate cross-reference of files for a specified topic.	
Srm	SRM	Draw a typical Shared Resource Management configuration.	
Valve	VALVE	Draw cross-section of microvalve.	HP 9872, 7225, 7470 or 7580 plotter
Wind	WIND	Draw diagram of wind distribution.	HP 9872, 7225, 7470 or 7580 plotter
Breakout	BREAKOUT	Play the Breakout arcade game	

Equipment Setup (Demo)

Description

This program polls the following devices to see if they are present:

	Device Selector
Plotter	705
Printer	701
3437A DVM	724
3325A Function Generator	717 or
8165A Signal Source	717

If they are present, their interface select code is stored in the appropriate variable. Otherwise, a zero is stored in that variable to indicate its absence.

How to Use

If the demo software driver is not currently in memory:

Type: LOAD "DEMO"
Press: EXECUTE

When the asterisk ("*") in the lower right corner of the screen disappears, indicating that the program is loaded,

Press: RUN

From the selection of softkeys at the bottom of the screen,

Press: SETUP (k0)

Required Input and Expected Results

This program is invoked automatically when DEMO is RUN, but if a device was not connected, or was not turned on, then the program will assume the device is not available. If the device is later connected or powered on, pressing the SETUP key will cause the program to recognize it.

Special Considerations

1. Note that some instruments or peripherals may need to have their device selector or device address switches (if present) adjusted to meet the default values given above.
2. You must use the subprogram described in Chapter 7 to dump graphics to an HP 82905B printer. Therefore, if you want to use that printer with the Series 200 demo, perform the following steps:

   a. Back up your demo disc.

   b. Make the changes to the file "DEMO" on your demo disc as follows:

      1. LOAD "DEMO" (EXECUTE).
      2. Change the data statement at the beginning of the file to contain the number 702 instead of 701. By doing this you can leave your printer address at 701, but the demo will look for a printer at device address 702. Since the program will not find a printer at 702, it will not offer the "DUMP" softkey in any of the demo programs. Instead, you will have to follow steps c. and d. to dump alpha and graphics, respectively.
      3. Now you need to insert the subprogram contained in the file "82905DUMP" on the BASIC Utilities Disc 2. You will want to insert the subprogram in the middle of the file "DEMO".

         SAVE "TEMP", Delimiter (EXECUTE)
         DELSUB "Delimiter1" TO END (EXECUTE)
         Insert Utilities Disc 2.
         LOADSUB ALL FROM "82905DUMP" (EXECUTE)
         Reinsert the demo disc.
         GET "TEMP",9000 (EXECUTE)
         RE-STORE "DEMO" (EXECUTE)

   c. Now when you run the demo, you will have to press the DUMP ALPHA key to dump an alpha screen. (If you are using a Model 16, merely type DUMP ALPHA and press (EXECUTE) when the demo is in an idle state; i.e., when you are requested to press continue to proceed.)

   d. When the demo is in an idle state, you can dump graphics by typing CALL Graphics_dump(701) (EXECUTE). Upon completion of the dump, you can proceed with the demo.

Auto Demo (AUTO)

Description

Choosing the AUTO softkey will place the computer and most of the demonstrations listed in this section of the manual into an auto-run mode. In other words, the demos will run automatically with no user interaction, linking the next demo file in at the conclusion of its predecessor, and running it.

How to Use

If the demo software driver is not currently in memory:

Type: LOAD "DEMO"
Press: EXECUTE

When the asterisk ("*") in the lower right corner of the screen disappears, indicating that the program is loaded,

Press: RUN

From the selection of softkeys at the bottom of the screen,

Press: AUTO (k4)

Required Input and Expected Results

Once this program is started, no input is required. Press EXIT AUTO when you wish to stop it.

Demonstration of Personal Computer Aided Design (PCAD)

Description

Personal Computer Aided Design is defined as the creation and production of objects by individuals using personal technical computer workstations.

The FILTER CIRCUIT demonstration illustrates how the knob could be used interactively to design a filter circuit. The program allows you to choose a component using the softkeys and then vary its value using the knob. The new frequency response is immediately calculated and plotted on a log-log scale.

The MECH DRAWING demonstration draws two orthogonal views of a mechanical part and labels the dimensions of the part.

The SPACE SHUTTLE demo draws the internal structure of the aft section of the space shuttle and shows maximum re-entry temperatures for the forward sections.

The STRESS ANALYSIS demo computes the stresses on a beam bridge. The knob allows you to place the load at each joint and the softkeys may be used to increase or decrease the load and then to solve the stress problem.

How to Use

If the demo software driver is not currently in memory:

Type: LOAD "DEMO"
Press: EXECUTE

When the asterisk ("*") in the lower right corner of the screen disappears, indicating that the program is loaded,
Press: RUN

From the selection of softkeys at the bottom of the screen,
Press: PCAD (k5)

Required Input and Expected Results

1. After pressing the PCAD softkey, another set of softkey labels appears. You have a choice of pressing, FILTER CIRCUIT, MECH DRAWING, SPACE SHUTTLE, STRESS ANALYSIS, or EXIT.

2. If FILTER CIRCUIT is pressed, a short program explanation is given followed by a display of a circuit design. The softkey labels contain the circuit's components, plus a RESULT and an EXIT key.

   a. Pressing any of the circuit component keys gives you a log-log plot which you can use interactively to adjust the component value and see the resulting frequency response.
   b. Pressing RESULT prints out the current values of the circuit components. If RESULT is pressed while the frequency response graph (Bode plot) is displayed, the program displays the circuit design, prints the component values, then returns to the Bode plot.
   c. By pressing CIRCUIT while in the Bode plot display, you return to the circuit design.
   d. Pressing EXIT takes you back to the PCAD menu.

3. Pressing the MECH DRAWING softkey causes the drawing and labels to be displayed on the CRT unless an external plotter is present.

   a. If an external plotter is present, three choices are made available to you. If the CRT softkey is chosen, the drawing will be displayed on the CRT. If the PLOTTER softkey is chosen, the drawing will be plotted on a 9872, 7225 or 7470 plotter. If the 7580 softkey is chosen, the drawing will be plotted on a 7580 plotter.
   b. If at any time while the drawing is being created the EXIT softkey is pressed, the program will return to the PCAD menu.
   c. When the drawing is complete, either the CONTINUE or EXIT softkey may be used to return to the PCAD menu.

4. Pressing the SHUTTLE softkey causes a short explanation to appear. Pressing the CONTINUE softkey displays another set of softkey labels, giving you the softkey choice RE-START, and if a printer is present, DUMP. The shuttle is then drawn.

   a. After the shuttle is drawn, pressing the LABELS softkey causes the program to display component labels for the aft of the shuttle.
   b. After the shuttle is drawn, pressing the TEMPS softkey causes the program to display labels of maximum re-entry temperatures on the forward section of the shuttle.
   c. If a printer is present and the DUMP softkey is pressed, then the shuttle drawing will be printed.
   d. Pressing the RE-START softkey will start the drawing of the shuttle from the beginning.

5. If STRESS ANALYSIS is pressed, a short explanation will appear. You will be prompted to CONTINUE or EXIT with the softkeys.

    a. The CONTINUE softkey displays an initial solution.
    b. The MOVE LOAD softkey allows you to move the load to the joints of the bridge interactively by using the knob. When the load is in the position you want, use the PLACE LOAD softkey.
    c. The INCREASE LOAD 50K and DECREASE LOAD 50K softkeys allow you to increase or decrease the load by 50,000 pounds.
    d. Anytime you move the load or change the weight of the load, you must press the SOLVE BRIDGE key to compute new stresses.
    e. The EXIT softkey here will return you to the PCAD menu.

6. Selection of EXIT from the PCAD menu returns you to the main demo menu.

Special Considerations

1. When using the plotter, it is assumed that the external plotter being used has eight pens. If this is not the case, the demos will still run correctly, although the ERROR light on the plotter will light showing that it received a command it couldn't execute.

Demonstration of Computer Aided Test (CAT)

Description

Computer Aided Test is defined as manipulation of data gathered from physical phenomena in the laboratory or factory, utilizing fast interrupt, buffered I/O and control outputs.

The FFT demonstration analyzes data gathered by your computer and the 3437A System Voltmeter. A 3325A demo Function Generator or 8165A Signal Source is used to generate a voltage waveform. These instruments can be programmed directly from the keyboard. If these instruments are not available, the data is also found in five data files containing prerecorded digitized waveform data on the demo disc.

The EMISSION CHART demonstration plots a chart showing the conversion efficiency of several pollutants as a function of fuel mixture.

The SYSTEM TEST demonstration presents a production test model useful for evaluating per-unit test cost expenses. In particular, an in-circuit test with a functional test is portrayed. Assembly and intermediate test yields are user-specifiable as are test and repair times. A variety of graphic menuing and data input techniques are utilized. The knob is used to enhance your interaction with the demonstration.

The MOTOR demonstration draws the resultant field for an induction motor as well as the phase shift between the start and run windings.

How to Use

If the demo software driver is not currently in memory:

Type: LOAD "DEMO"
Press: (EXECUTE)

When the asterisk ("*") in the lower right corner of the screen disappears, indicating that the program is loaded,

Press: (RUN)

From the selection of softkeys at the bottom of the screen,
Press: CAT ((k6))

Required Input and Expected Results

1. After pressing the CAT softkey, another set of softkey labels appears. You have a choice of pressing FFT, EMISSION CHART, SYSTEM TEST, MOTOR or EXIT.

Required Input and Expected Results

Pressing the FFT softkey causes the following to occur.

a. Several numbers flash on the screen, then a program explanation is displayed. The flashed numbers are determining how much memory is available by doing a LIST command and reading the amount of available memory from the screen.

b. If the required instrumentation is present and recognized by the system, you can select your source of input data by pressing either DISC or 3437A. If no instruments are present, defaults are chosen (e.g., number of points, internal disc as source of data).

c. Next you can select the waveform you wish from the choices SINE, TRIANGLE, and SQUARE if you're using an 8165A, or SINE, SQUARE, TRIANGLE, RAMP UP, and RAMP DN if you're using a 3325A.

d. If the necessary equipment is attached and you chose 3437A in step 1, you can now choose the number of readings to be taken from the key labels 128, 256, 512, 1024, and 2048. (If your computer has a small amount of memory, then you will only be able to choose from 128, 256, and 512 readings.)

e. If a graphics printer is attached and recognized by the system, you can now choose whether or not to receive a hard copy of the plots by pressing the displayed YES or NO softkeys.

f. After all required input has been received, the program plots the time domain data, performs an FFT, plots a frequency spectrum, calculates and plots a power spectrum, and calculates and plots an auto correlation.

g. Pressing the EXIT softkey returns you to the CAT menu.

2. Pressing the EMISSION CHART softkey causes the chart to be plotted on the CRT unless an external plotter is present.

   a. If an external plotter is present, three choices are made available to you. If the CRT softkey is chosen, the chart will be displayed on the CRT. If the PLOTTER softkey is chosen, the drawing will be plotted on a 9872, 7225, or 7470 plotter. If the 7580 softkey is chosen, the drawing will be plotted on the 7580 plotter.

   b. Pressing the EXIT softkey at any time will return you to the CAT menu.

   c. Pressing either the CONTINUE or EXIT softkey upon completion of the chart, will return you to the CAT menu.

3. If SYSTEM TEST is pressed, a brief description of the demonstration is displayed.

   a. Pressing CONTINUE causes a test model parameter menu to be displayed.

   b. While the test model parameter menu is being displayed with default values, you can move the arrow located to the left of the menu up and down using the knob. A parameter value can be changed when the arrow is pointing to it and either the VARY or UPDATE softkey is pressed. DEFAULT and EXIT keys are also available.

1. If the UPDATE softkey is chosen, the program displays a rising column which can be controlled by turning the knob. When the value desired is indicated in the columns, pressing the RECORD softkey will update the appropriate parameter with the value. The program now returns to the test model parameter menu (step b. above).
2. By pressing the VARY softkey, you can assign a "spread" for the selected parameter to vary across during the analysis. Note that only one parameter can vary during an analysis. If the VARY softkey is selected, a rising column is displayed from which values can be selected. Using the knob, select a starting spread value and depress the START softkey. Again, using the knob, select an ending spread value and depress the FINISH softkey. Upon doing so, the spread values are checked for validity and assigned to the parameter selected to vary. The program now returns to the test model parameter menu (step b. above).
3. Pressing the DEFAULT key will update the parameters with the default values originally assigned by the program.

d. Pressing EXIT returns the program to the CAT menu.

4. Pressing the MOTOR softkey causes the chart to be plotted on the CRT unless an external plotter is present.

   a. If an external plotter is present, three choices are made available to you. If the CRT softkey is chosen, the chart will be displayed on the CRT. If the PLOTTER softkey is chosen, the drawing will be plotted on a 9872, 7225, or 7470 plotter. If the 7580 softkey is chosen, the drawing will be plotted on the 7580 plotter.
   b. Pressing the EXIT softkey at any time will return you to the CAT menu.
   c. Pressing either the CONTINUE or EXIT softkey upon completion of the chart will return you to the CAT menu.

5. Selection of EXIT from the CAT menu returns you to the main demo menu.

Demonstration of Computer Aided Work (CAW)

Description

Computer Aided Work is defined as manipulation of information for human viewing and interaction.

STATISTICS LIBRARY demonstrates the Regression Analysis and Residual Analysis portions of the Series 200 Statistics Library. DOW JONES draws sequential plots of Dow-Jones industrial averages over certain time periods. FORECAST demonstrates portions of the Series 200 Forecasting applications package. ELECTRONIC FILING gives you an immediate cross-reference of files for a specified topic.

How to Use

If the demo software driver is not currently in memory:

Type: LOAD "DEMO"
Press: EXECUTE

When the asterisk ("*") in the lower right corner of the screen disappears, indicating that the program is loaded,

Press: RUN

From the selection of softkeys at the bottom of the screen,

Press: CAW k7

Required Input and Expected Results

1. Pressing the STATISTICS softkey causes the following sequence.

    a. From time to time, after the machine has issued instructions or plotted graphics on the CRT, the program will pause execution so you can examine the screen. To resume execution, press the CONTINUE softkey.
    b. The program reads a data file ("VAPOR"), prints some information about the file, and plots it on the screen. If you have a plotter connected to the system, like a 9872, 7225, or 7580, the program offers you the alternative of putting the graph on the plotter or on the screen.
    c. Next some simple statistics are printed, along with a preliminary AOV table, and you are asked to select the degree of the polynomial to fit to the data points. A valid entry is from 1 to 6.
    d. Then you are asked to enter a confidence interval, at which point the fitted polynomial is plotted over the original data.
    e. You are then given the opportunity to fit a different curve to the data or to go on to the residual analysis part of the demo.
    f. A standardized residual table is printed and a graph is plotted showing how far off the computed curve the data points lie. The residual analysis is a good toll for spotting cycles in the differences, as well as outlying data points.
    g. When the graph has been plotted, you can either replot the graph or press EXIT to return to the CAW menu.

2. Pressing the DOW JONES softkey causes a graph of the Dow-Jones Industrial average over a certain time period to be drawn. You may press the CONTINUE softkey to go to the next graph. There are four Dow-Jones graphs. Pressing the EXIT softkey (or the CONTINUE softkey on the last graph) causes the program to return to the CAW menu.
3. Pressing the FORECAST softkey starts the demonstration of parts of the Forecasting Applications package. The demo takes some previously acquired data and draws a graph of the raw data. The seasonal corrections are calculated and plotted with the raw data. The data is then smoothed and plotted again. Finally, the next year is forecasted and plotted. The program displays features of the smoothing and forecasting pack. At this point, you may press the CONTINUE or EXIT softkey to return to the menu. Throughout this demo, you may press the CONTINUE softkey to go to the next display.
4. Pressing the ELECTRONIC FILING softkey causes the following:

    a. A brief description is displayed and you are prompted to either CONTINUE or EXIT using the softkeys.
    b. If you press the CONTINUE softkey, contents of a data file are listed. This data file contains categories, file names and short notes about the files. The physical files themselves (memos, papers, meeting notes) would be located in a filing cabinet. You will be prompted to continue the listing by pressing the CONTINUE softkey.
    c. At the end of the listing, the CONTINUE softkey prompts you to proceed. You may then select from the BROWSE, FIND, LIST, DUMP and EXIT softkeys. (DUMP is available only if a printer is present.)

        1. The BROWSE mode allows you to look at each file name. You can use the knob to control the direction of the browsing. The EXIT softkey will return you to the BROWSE/FIND/LIST/DUMP/EXIT menu.
        2. The FIND mode offers four choices of softkeys: STRING, NEXT, PREVIOUS and EXIT. STRING must be pressed before NEXT and PREVIOUS can be used. STRING will prompt for a string to be found in a category or file name and then search for the string beginning with the first file. The NEXT and PREVIOUS softkeys can be used to search the rest of the file for the same string. The EXIT softkey returns the program to the BROWSE/FIND/LIST/DUMP/EXIT menu.
        3. The LIST mode offers four choices of softkeys: CATEGORIES, FILES, ALL and EXIT. CATEGORIES allows you to display category headings for the filing system. FILES allows you to display the files in the category most recently selected via BROWSE. ALL allows you to display all files in the filing system. The EXIT softkey returns the program to the BROWSE/FIND/LIST/DUMP/EXIT menu.
        4. If a printer is present, the DUMP mode offers the same choice of softkeys as LIST except that files are listed on the printer.

    e. Pressing EXIT from the BROWSE/FIND/LIST/DUMP/EXIT menu returns the program to the CAW menu.

Miscellaneous Demos (MISC)

Description

This series of demo programs demonstrates Shared Resource Management, displays two plots that can be plotted on an HP plotter, and offers the Breakout game for your enjoyment.

How to Use

If the demo software driver is not currently in memory:

Type: LOAD "DEMO"
Press: (EXECUTE)

When the asterisk ("*") in the lower right corner of the screen disappears, indicating that the program is loaded,

Press: (RUN)

From the selection of softkeys at the bottom of the screen,

Press: MISC ((k8))

Required Input and Expected Results

1. After pressing the MISC softkey, SRM, VALVE, WIND, BREAKOUT, and EXIT appear in the softkey labels. Press one of the new softkeys.
2. Pressing the SRM softkey displays a short explanation of the Shared Resource Management (SRM) product followed by a display of a typical SRM configuration. A dedicated Model 26 computer acts as the SRM controller that powers three multiplexers and allows a mixture of Model 16, 26 and 36 computers as well as 9845 computers to share files, a hard disc and a printer. Notice that two additional computers could be connected to the SRM network.

    a. Pressing the EXIT softkey at any time returns the program to the MISC menu.

3. The VALVE demonstration draws a cross-sectional view of a microvalve.

    a. If an external plotter is present, three choices are made available to you. If the CRT softkey is chosen, the drawing will be displayed on the CRT. If the PLOTTER softkey is chosen, the drawing will be plotted on a 9872, 7225 or 7470 plotter. If the 7580 softkey is chosen, the drawing will be plotted on a 7580 plotter.
    b. If at any time while the drawing is being created the EXIT softkey is pressed, the program will return to the MISC menu.
    c. When the drawing is complete, either the CONTINUE or EXIT softkey may be used to return to the MISC menu.

4. The WIND demonstration draws a diagram which shows distribution of wind direction at a given location over a certain time period.

   a. If an external plotter is present, three choices are made available to you. If the CRT softkey is chosen, the drawing will be displayed on the CRT. If the PLOTTER softkey is chosen, the drawing will be plotted on a 9872, 7225 or 7470 plotter. If the 7580 softkey is chosen, the drawing will be plotted on a 7580 plotter.
   b. If at any time while the drawing is being created the EXIT softkey is pressed, the program will return to the MISC menu.
   c. When the drawing is complete, either the CONTINUE or EXIT softkey may be used to return to the MISC menu.

5. Breakout is an arcade game adapted to your Series 200 Computer. Turning the knob moves a "paddle" left and right along the bottom of the screen to intercept a "ball" which bounces off the "bricks" on the screen. The brecks are arranged in horizontal rows across the top and have varying point values by row location. Every time the ball strikes a brick, the brick is erased and its point value added to your score. The game is over when all the bricks have been erased or when you use up all your balls.

   When the softkey, BREAKOUT, is selected, the game is displayed and remains idle until you press the MANUAL softkey. Other softkeys available with the game are NUM OF ROWS, LEVEL, TRAIL, AUTO, and EXIT.

   a. NUM OF ROWS allows you to select 3, 5, or 9 rows of bricks at the start of a game.
   b. The LEVEL of expertise you feel you can handle ranges from EASY to MEDIUM to DIFFICULT.
   c. TRAIL can be toggled to cause a trace of the ball's position to be drawn as it progresses.
   d. AUTO allows the program to run automatically.
   e. MANUAL begins the game.
   f. EXIT causes the program to return to the MISC menu.

6. Pressing EXIT returns you to the first level demo softkey selection.

HEWLETT PACKARD

Manual Update

HP Series 200 Computers
BASIC Utilities Library
(for manual part number 09800-10601, dated October 1982)

A new CS/80 Tape Backup utility is now provided on the 98612A BASIC 2.0 Extensions disc. Documentation for this utility has been appended to Chapter 4 of the *BASIC Utilities Library* manual.

Insert the new section contained in this update at the end of Chapter 4 as a reference to this new utility.

Replace pages ii and iii with the new pages provided.

Supplement to 98612-87902
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BASIC Utilities Library

for the HP Series 200 Computers

Part No. 09800-10601

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Printing History

New editions of this manual will incorporate all material updated since the previous edition. Update packages may be issued between editions and contain replacement and additional pages to be merged into the manual by the user. Each updated page will be indicated by a revision date at the bottom of the page. A vertical bar in the margin indicates the changes on each page. Note that pages which are rearranged due to changes on a previous page are not considered revised.

The manual printing date and part number indicate its current edition. The printing date changes when a new edition is printed. (Minor corrections and updates which are incorporated at reprint do not cause the date to change.) The manual part number changes when extensive technical changes are incorporated.

October 1982...First Edition

January 1983...Update: CS/80 Tape Backup utility added to Chapter 4.

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CS/80 Tape Backup

This section describes how to use the tape backup utility and the BASIC File System to copy all or part of the contents of an HP 7908, 7911 or 7912 hard disc to the DC600 tape cartridge. The reverse operation (copying from tape to disc) is also described. The tape backup utility is delivered on the 98612A BASIC 2.0 Extensions disc.

If you have one of the Command Set '80 disc drives, you may also have the optional tape cartridge drive for backing up the disc. The installation and operation manual that came with the drive describes one method of tape backup. It involves switches and buttons located on the disc drive. BASIC provides two computer controlled methods of tape backup. The first is a utility program which provides for backup of the entire contents of the device. The second is the BASIC File System which can be used for selective backup of files.

The Tape Backup Utility

The Tape Backup Utility (TAPEBACKUP) is a program that enables you to copy the complete contents of a disc onto a tape, or the contents of a tape onto a disc. The utility also contains functions for verifying the data integrity of a disc or tape.

It is important to note that the utility only provides for a **complete** backup of a mass storage device; it does not provide for selective file access. A limited amount of selective file access to the tape is available by using the BASIC File System.

The standard option for CS/80 integrated disc/tape drives provides a common controller that is shared by both disc and tape drives. The disc is unit 0; the tape is unit 1. One of the features of the disc/tape drives is the ability of the controller to transfer data directly from unit 0 to unit 1, or vice-versa, without having the data travel over the HP-IB. This utility was written specifically to support this mode of backup, as it is usually the most efficient.

There is an option for the disc/tape drives which provides dual controllers, where the disc has its own controller and the tape has its own controller. Each controller has its own separate HP-IB port, and must be assigned a separate HP-IB address if it is on the same HP-IB as the other controller. **This utility does not support the dual controller option.** That option is intended for use with larger systems.

The utility is quite simple to use. Make sure you have loaded BASIC 2.0 and BASIC 2.0 Extensions. Then load and run the utility by inserting the 98612A BASIC 2.0 Extensions disc into the disc drive and typing:

```
LOAD "TAPEBACKUP",1 [EXECUTE]
```

The program prompts you to select a softkey ([k0] to [k3]) to COPY, VERIFY, CERTIFY or QUIT. Pressing a softkey will begin the selected operation.

The COPY Operation - k0

The **COPY** operation first prompts for the HP-IB address of the CS/80 disc involved in the backup. For instance, to specify the CS/80 disc on select code 7 and bus address 2, type the following line in response to the prompt:

702 ENTER

You will then be asked if you wish to copy the disc to the tape or the tape to the disc. Respond to this prompt with the **destination** media. For example, when copying the contents of the disc to the tape, the tape is the destination media, so respond to the prompt with:

TAPE ENTER

Note that the entire contents of the destination media will be overwritten and lost during the **COPY** operation. A final prompt will ask you to confirm the selected operation.

The **COPY** operation does a check on medium sizes. **COPY** currently disallows copying to a destination tape which is smaller that the source disc. Be forewarned, however, several other combinations of source and destination which make little sense **are allowed**. If you have more than one CS/80 disc drive, be sure to mark the type of drive which is backed up on each tape. If you were to copy a tape backup of an HP 7908 onto an HP 7911, you may not be able to create files past the 7908's 16 megabyte limit until the 7911 is re-initialized.

If the destination is the tape, it receives some special attention before the copy actually begins. First, it is tested to see if it has been certified. Tape certification is a procedure very similar to hard disc initialization. Even though the medium is formatted by the manufacturer, it needs thorough testing, with possible sparing of bad blocks, before it is acceptable for use. (A spared block is entered into a table and never used.) If the tape hasn't been previously certified, it is run through the certification process. Tape certification takes a long time; however, tapes usually need to be certified only once during their lifetime.

If a tape has already been certified, the controller then spares blocks which have recently given trouble. This way, the tape actually tends to get better with usage. Troublesome blocks that may have been missed during certification become spared later.

Copying then takes place under control of the device itself. It proceeds at a rate of about 35 Kbytes per second, or roughly two Megabytes per minute. At this rate, an HP 7908 takes about eight minutes, a 7911 about 14 minutes, and a 7912 a little over 30 minutes to copy. Any data that is unreadable will be sent to the destination as a best guess, and the copy will proceed to its completion regardless of any errors. Errors will be reported by a message on the CRT.

If the destination is a tape, an end-of-file mark is written to it. If the destination is a disc, an automatic verification takes place. If you want to verify a tape you will have to do it explicitly. It is not done automatically because of the time involved.

The VERIFY Operation - [k1]

The **VERIFY** operation first prompts for the HP-IB address of the disc (e.g., 702). Next, you are asked which drive you want to verify, either TAPE or DISC. After specifying the drive to be verified, you will be asked if you wish to proceed. For instance, if you specified TAPE as the drive to be verified, the following prompt would appear:

```
Are you SURE you want to verify the tape?
```

Typing Y [EXECUTE] causes the operation to commence immediately. If any unreadable blocks are encountered, their addresses are printed to the screen.

If a tape gives trouble verifying, don't re-certify it; merely repeat the entire **COPY** operation again. The tape controller "remembers" where the bad blocks are, and will automatically spare them during the next **COPY**.

If a disc gives trouble verifying, the recommended procedure is to copy its contents to a tape, then re-initialize the disc using the INITIALIZE statement. INITIALIZE performs a two-pass error rate test on the entire disc, and then further tests any blocks that the disc controller "remembers" as troublesome. All bad blocks will be spared. After INITIALIZE is finished, copy the contents of the tape (the original contents of the disc) back onto the disc.

The CERTIFY Operation - [k2]

The **CERTIFY** operation is associated only with tapes. Providing this function separately may seem unnecessary since the utility automatically certifies an uncertified tape before it writes to it. However, it has been included in the utility in case you want to certify several tapes at one time, without having to write data to them.

Another use of this operation is to force re-certification of previously certified tapes. You would want to do this only if you suspect that blocks on the tape had somehow been spared unnecessarily. This situation might arise on a tape drive with dirty heads.

QUIT - [k3]

Simply terminates the utility program.

Using BASIC for "Direct" Tape Access

BASIC Extension AP2.0 does provide you with the capability of directly accessing the tape as you would any other mass storage device. This capability allows you to initialize and certify the tape using INITIALIZE, then use the BASIC File System to copy files to it, list its directory, store programs, etc. Note that file TRANSFERs are not allowed to a CS/80 tape.

You can also use BASIC mass storage statements to access a disc image that was copied to a tape using TAPEBACKUP. This is useful to retrieve a single file from a disc image backup without copying the entire tape back to the disc.

When you want to use the tape for selective backup/retrieval versus complete backup/retrieval, you have to be careful how you do it, in order to avoid a couple of common pitfalls. These pitfalls are associated with the inherent characteristics of a streaming tape drive, namely its slow seek times and its inability to start and stop rapidly.

For each file written to the tape, the following sequence occurs:

1. A seek is performed to the very beginning of the tape to scan the directory.
2. The entire directory is scanned, one block at a time.
3. A seek is performed somewhere "out in the middle" of the tape to write out the file body.
4. A seek is performed back to the beginning of the tape to update the directory.

With this information at hand we now discuss general rules.

Avoid Large Directories on the Tape

Streaming tapes can't stop and start between blocks, but actually coast to a stop, back up, and take a running start at the next block. You can see that scanning a large directory one block at a time will be a painfully slow process. It also accelerates wear on both the tape and the tape drive.

What constitutes a "large" directory? You'll ultimately have to decide, but the following information should aid you in making your decision. The first block of a tape with a LIF directory will contain the LIF volume label and sixteen directory entries. Each block thereafter can contain thirty-two directory entries. Thus, the logical breakpoints in directory sizes are 16, 48, 80, ... 16 + 32N. It is generally recommended that you not go above 80 directory entries.

Avoid Unnecessary CAT Operations

When doing a CAT operation on a tape, the system sector of each BDAT file must be read to determine the logical record size. Thus, for each BDAT file, the tape must seek out to the beginning of the BDAT file, read a record, then seek back to the directory. Since this operation is both slow and adds to the wear on the tape and drive, avoid unnecessary CAT operations.

Avoid Copying Small Files

Considering that each seek on the tape may take up to tens of seconds, you can see that if you transfer small files, you will probably spend a high percentage of your time seeking back and forth on the tape, and a very small percentage of your time actually copying data.

Avoid File Copies with Little Available Memory

The BASIC COPY statement operates by reading in as much of the source file as will fit in available memory, then writing that portion of the file out to the destination file. This read-then-write operation is repeated until the entire file is copied. If only a small amount of computer memory is available, copying a file may require many read/write operations, with the streaming tape stopping, backing up, and re-starting for each read/write cycle. You can increase the amount of available memory by executing a SCRATCH or SCRATCH A statement before performing the file copy.

Advantages to Selective Backup and Retrieval

Even considering the known pitfalls, selective backup/retrieval to the tape using the BASIC File System is an extremely valuable capability. Here are some advantages:

- You can back up only the files which changed since the last backup, possibly saving time and the amount of media required for backup.
- You can use the CS/80 tape to back up files from **any** and **all** BASIC-supported mass storage devices, and not just the associated CS/80 disc.
- You can interchange data with other HP machines that support LIF on DC600 tapes.
- A single tape can hold many revisions of the same file, which is convenient during program development. All revisions of the file must be named uniquely, of course.

There are two lengths of tapes; 17 and 67 Mbytes. Both tapes can be used for direct access on any of the following discs: 7908, 7911 and 7912.

Compiled Subprogram Considerations

The TAPEBACKUP Utility contains three compiled subprograms which perform the CS/80 backup, verify, and certify operations. These compiled subprograms are very similar to BASIC subprograms, except they were generated from compiled code, not BASIC statements.

There are a few important differences between compiled subprograms and BASIC subprograms. Compiled subprograms cannot be syntaxed, which means that they cannot be modified from BASIC or read with a GET statement. Compiled subprograms can, however, be manipulated with LOAD, STORE, and LOADSUB. Comments or other BASIC statements may not be placed between or directly after the CSUB statements. You may place a SUB or DEF FN statement directly after the last CSUB statement.

You may wish to modify or replace the BASIC utility program with your own application that calls one or more of the provided compiled subprograms. The BASIC utility with its comments should give you enough information to modify or write your own utility. You may then add the compiled subprograms to the end of your new utility by typing:

```
LOADSUB ALL FROM "TAPEBACKUP"  EXECUTE
```

and storing the new program under a different file name.

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